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Psychiatric Clinics in the Schools
John T. MacCurdy

The Relation of Alcohol and Syphilis to Mental Hygiene
Frankwood E. Williams

The Relation of Social and Economic Factors to Mental Hygiene
C. Macfie Campbell

Malaria in the United States
J. W. Trask

The New United States Life Tables
James W. Glover

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PSYCHIATRIC CLINICS IN THE SCHOOLS.

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Read before the General Sessions, American Public Health Association, Cincinnati, October 24, 1916.

The purpose of this important paper by Doctor MacCurdy is to point out why psychiatric clinics in the schools may offer reasonable hope of reducing insanity in the later life of the pupils. And since it is undoubtedly true that the next problem of public health administration will be concerned with mental disorders, where better to begin than with the school child?

THE members of this Association do not need to be told what a drain the constant occurrence of insanity makes on the state. Mental aberrations, however, are not always severe enough to demand sequestration; in fact, it is likely that there are many unstable individuals who never become actually insane, for every patient who suffers that legal and social stigma. The prophylaxis of insanity is, therefore, as much a problem of conserving and augmenting the efficiency of many so-called normal citizens as it is of saving the state the cost of supporting the hopelessly incompetent.

In the advance of medicine in other fields we have become familiar with the general trend of the history of treatment of any given disease. There is first the palliative and empiric treatment of symptoms; next, when its causation is established, comes rational and specific cure of the disease as such; and, finally, there is prevention. Psychiatry, it must be confessed, has not progressed far beyond the first stage, although of recent years much has been learned of the specific pathology of some psychoses. That this pathology does not concern itself entirely with anatomy and laboratory findings makes it often less tangible to the average practitioner, but none the less actual. It is probably safe to say that the psychology of the abnormal is as accurate a science as bacteriology or pharmacology. In spite of this advance in the theory of psychic disturbances, we are faced today with no diminution, perhaps

with an increase, of the incidence of insanity. It is time for psychiatrists to offer a definite program of prophylaxis and an important part of this is concerned with education. It is the purpose of this paper to show why psychiatric clinics in the schools may offer reasonable hope of reducing insanity in the later life of the pupils.

It is not necessary to expatiate to this audience on the advantages of physical hygiene during the period when the nervous system is completing its developments, and its functions becoming habitual reactions. I can proceed at once to the problem of mental hygiene as such. How far does its sphere extend? How much may the education of children be expected to contribute to it?

Let us begin by considering what general factors seem to determine mental aberration. There are two rough divisions, or, to speak more accurately, perhaps, two extremes of type to be met in psychopathology. In one the preponderant factors are physical and specific, such as infections, intoxications, injuries and degenerations of nervous tissues. These cases are characterized by a loss of the purely mechanical intellectual processes of memory, calculation and the like. In the second and opposing group we have no primary intellectual defect but rather disturbances in the emotional and ideational spheres. These latter show no constant or specific autopsy findings, but the symptoms can be shown very often to be a development of previous faulty mental habits which have rendered the patient incapable of ready adaptation to the demands of life. In other words, this pathology is a psychological matter.

For the first, or organic, group much can often be done by early diagnosis, but, as even the premonitory symptoms seldom develop in the school age, the aim of psychiatric clinics in the schools must be the prevention of the mental and nervous diseases that fall in the constitutional or functional group.

It is becoming constantly more evident to psychiatrists that there is a striking similarity between the type of mental processes seen in the functional psychoses and that of children. To make this plain I need only mention that in each we observe a slight grasp of reality: the seriousness of the child's make-believe is closely allied to the fixity of a delusion. That one is normal and the other a psychotic phenomenon is determined essentially by the age of the subject. In other words the abnormal subject has never entirely outgrown his tendency to think and act as he did in the nursery. In the normal and ideal development the individual seems spontaneously to develop a more adult type of thinking as the growing responsibilities of life become more urgent. This ideal development rarely, if ever, proceeds with absolute smoothness and nothing can disturb its harmony so completely as the sudden demand for an adaptation for which the subject is constitutionally unprepared. Two obvious conclusions may be drawn from this. First, that the primary object of education must be to foster this development rather than to instil mere knowledge. Tools are of no use without the

ability to use them, and the youth who has not outgrown the mental attitude of the nursery when he faces the outside world is not helped to acquire that attitude by the acquisition of facts or the ability to run up a column of figures. The second is that, since school life is generally the first great adaptation which the child meets on leaving the nursery, it may easily hinder his development if he be incapable of meeting its demands. His careful observation at this point may lead to a discovery of his latent inelasticity of character at a time when such defect may be remedied. The function of the psychiatrist in the school would therefore be twofold: to guide the education of the normal child with a view to maintaining his normality, and to detect and remedy abnormal tendencies.

The objection is sure to be raised that this is not psychiatry but pedagogy. When the millenium comes this will certainly be true, and before that we may assume that psychiatry exists because pedagogy has been unable to fulfil its aims. Practically, however, the fields are at present distinct for the simple reason that the detection of abnormality in a child is much too subtle an affair to be achieved by the intelligence of the average teacher with the average training. Examinations in history or arithmetic, even the Binet scale, may show what ability the child has to absorb and release facts. The psychiatrist is interested in the finer, the emotional reactions of the scholars.

A small beginning has been made by the provision of ungraded classes in many of our public school systems, but these classes seem to become filled with those who are backward intellectually rather than abnormal in their type of thinking and emotions. These classes do excellent work for the feebleminded, because they can be treated gregariously. Their defects are common to all. The abnormal child presents an entirely different problem. He may be precocious intellectually and lead his class, yet give his teacher or parents more trouble than any other pupil. Either teacher or parent is, as a rule, satisfied to pigeonhole the unlucky scholar as mischievous, possessed of a bad temper, shy, naughty or just "queer." If the character anomaly of the child has affected his capacity to learn he may find his way into an ungraded class but the psychiatrist will discover the bulk of his material among those who make their grade on schedule but nevertheless present problems demanding intensive individual study. If only psychopathic children were admitted to the ungraded class much more could be done for them there, but overrun as they are with defectives, the pupils who enter it are apt to be told by their fellows that they are in the "dummy class." For children already handicapped with morbid sensitiveness, the ungraded class then becomes a burden. It is better, if possible, to keep the child in contact with his more normal mates but have his discipline and education made more elastic under the supervision of a competent psychiatrist. Such suggestions at once raise the cry that "discipline" demands the equal treatment of all pupils in

the same class. As a matter of fact it is just this uniformity which is so baneful. If the intrusion of psychologists into the school did no other service than disrupt the time-honored custom of forcing all children into the same mould, they would still do the state unspeakable good. A jockey who took no more account of the varying personalities of his horses than the prevailing public school systems study their pupils, would be a flat failure. When one considers the appalling social losses today suffered through neuroses, insanity and crime, a large part of which are traceable to perverted development, the responsibility of the school system is seen to be grave.

Of course the public school is not the only factor in the education of children. Home influences are at least as important, if not the paramount factor in the development of the child. One of the greatest difficulties under which teachers labor is that their pupils come to them so often from the worst possible environment. The neurologist and psychiatrist when studying the life-history of their neurotic and psychotic patients are constantly wishing that they could have begun a generation earlier and treated the parents, whose theories of child nurture are so unsound or whose carelessness has been so extreme. It seems as if the average father and mother thought that the character of children just "grew" like Topsy and that the children are culpable if they fail to grow properly. If the state could teach paternity and maternity and then hold parents responsible for the lapses of their children, we would have many fewer criminals, insane and neurotics. But how can this education be given? How can the parents be reached?

This is an ambitious program, but psychiatric clinics in the school can certainly help to put it into effect. The history and examination of the abnormal pupil are not complete until the home has been thoroughly investigated. Similarly no treatment can be efficacious if it does not operate both in school and home. In this way the state can gain an entrance into the home and give the advice where it is most needed. It is gratifying to know that, in the beginnings of such clinics as now exist in New York, improvement in the mental health and happiness of the children examined has not always been confined to those who showed obvious need of treatment but has been evidenced in the more normal brothers and sisters. No home environment can be improved for one without benefiting all. We have, therefore, good ground for the hope that in psychiatric school clinics we may find an agency that will bring better coöperation between school and home in the greatest task of the state, the making of its citizens.

This Association is probably not interested in knowing the details of organization of such clinics. As a matter of fact these material considerations can only be matured by experiment and such work as has already been done is the merest beginning. It is understood, of course, that each clinic should consist of at least one trained psychiatrist, sufficient sten-

ographic force to keep all records, and a social service staff to obtain information in the homes, bring parents to the clinic, where possible, and oversee the extramural treatment. Naturally it would be the duty of every teacher in the school to be a "social service worker" in the school; they would be considered part of the clinic.

It is of more interest to discuss, even if only in generalities, the kind of problems with which the clinics would deal. Time does not permit the recital of clinical cases, but you are all familiar with what are known as "difficult" children; those who have read Healy's book on juvenile delinquents will be conversant with the grave consequences which such abnormalities may entail. Children have so little of that self-consciousness which enables adults to formulate their motives that their conduct is apt to be described in moral rather than psychological terms. This undoubtedly makes their study more difficult but the difficulty is more than offset by the rewards of treatment. The child's mind shows a plasticity quite foreign to the fixity of the adult's mental habits. The task of the psychiatrist is to find out why the child won't study, seems to hate a certain subject, is shy with his playmates, is given to violent tempers, is afraid of his teacher or prefers her society to that of the "gang" after school is over. A hundred such tendencies, all inimical to smooth development, have their history and when this is unravelled the various factors may be altered or offset by other influences.

As cannot too frequently be repeated, this means individual study. Even two children from the same home may have been reared under totally different influences. One may be a father's or mother's favorite, the other a scapegoat. Obviously this individual study presupposes personal interest and is effective only in so far as mutual confidence is established. When this is achieved a great deal can be done for the child which parents cannot do out of ignorance and teachers fail to accomplish through lack of personal touch. As an example of this we may consider a question of such fundamental importance as sex enlightenment. Parents fear the topic and are more often than not the victims of popular superstitions as to bare facts. On the other hand to lecture to a classroom on such a topic is so difficult a task as to be almost ludicrous. The emotional potentiality of this instinct is so great and its exhibition so various that it is impossible to adapt one's words to the needs of each in the group. I have had the experience of talking to medical students on adolescent difficulties and precipitating a breakdown in one of them. An individual talk, on the other hand, almost invariably does good. It is plain that no one could be better entrusted with this important and delicate task than the psychiatrist who suffers under the disabilities of neither teacher nor parent and has wider knowledge than either. Only those who treat neurotic patients can realize what incalculable later suffer-

ings such an opportunity for early enlightenment would prevent.

Many of you are probably beginning to think that the psychiatrist I am describing is usurping the function of the family physician. This is largely true. With the growth of departmental dispensaries for the poor and the consultation of specialists by those of larger means, the patient is losing what he once had, a confidant, father confessor and doctor in one. This loss is not to be made good by the abandonment of specialties but by the development of a new one—psychiatry. The modern psychiatrist is one who makes a scientific study of the problems whose solution previously were left to the kindliness and common sense of the general practitioner. The psychiatrist must assume this burden because it is only by this mental hygiene that he can prevent the ravages of neuroses and psychoses. As a public servant he can ply his trade nowhere to better advantage than in the schools.

A word may be said about the place of these clinics in the general organization and routine of the school. As the psychologist is constantly experimenting he must always be in a position to advise what subjects are most advantageous to the pupil and what are useless or harmful. If his advice be taken, the time will come much sooner when the object of education is to teach the child to think and behave effectively rather than to amass impedimenta of facts. Again, only those whose spirit is experimental can safely be trusted with the responsibility of discipline, for it is notorious that children vary greatly in their reaction to disciplinary measures. A word of reproof may depress one, embitter another, while correcting a third. Similarly corporal punishment may be mental torture to one, make another stubborn and impress a third as a fair *quid pro quo*. A psychologist who has studied the child may be able to predict the result; at least, he would never be guilty of the folly of trying to remedy ineffective discipline by its repetition. Discipline would therefore most logically be placed in the hands of the clinic.

At another point, too, the psychiatrist is sure to upset traditions. As his standard of education is not the accumulation of facts but the ability to adapt, he will counsel the retention of the teachers who can train minds and urge the dismissal of those neurotic pests who owe their positions to a mere facility in acquiring and disgorging information. We are constantly being impressed with the fact that what is commonly spoken of as neuropathic, hereditary taint is largely to be accounted for on the basis of environment. The neurotic parent may transmit his taint in varying degrees but we do know that he always fosters neurotic reactions in the child. It is the neurotic parent who is impatient, over affectionate or aloof. This is bad enough in the home and such people are hard to persuade of their error, but why should it be tolerated in the school? Yet we all can recall teachers the nature of whose teaching and discipline depended on how they slept the night previous.

Finally, a word as to the need of psychiatric studies of children for psychiatry itself. There are problems in this science that can only be solved in this way. For instance, consider dementia præcox. This disease we know as a group of symptoms that appears in late adolescence or early maturity. But we now know more: that the disease was already present in the make-up of the child and that the more obvious symptoms appear when the youth comes more into contact with a world he is incapable of meeting. Owing to the great difficulty in getting intelligent anamneses we shall never know the full extent of this "make-up" nor how far it can be modified until we have large data from many children. With the hereditary factor as prominent as it is in this disease we can be fairly sure that many children are born congenitally incapable of changing their mental constitutions. When many such have been examined and the later history of the subjects followed, we shall be able, I hope, to discriminate between the good and bad features of a faulty make-up. Until this is done no set of statements gathered from adults can ever really teach what the dementia præcox make-up is and how far it is alterable. The psychiatrist, therefore, needs the schools just as the schools need the psychiatrist.

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THE AUTOMOBILE AS A CAUSE OF POLIOMYELITIS.

The newspapers have given an unusual amount of space to the recent epidemic of poliomyelitis, which is remarkable in view of the small number of cases of this disease as compared with epidemics of such diseases as scarlet fever, diphtheria and other exanthems. An explanation is to be found in the insidious nature of the disease and its serious after-effects, in addition to the high mortality. Naturally there has been a large crop of sensational statements as to its causation and treatment. Not the least remarkable is one which has gone the rounds of the press during the past week. This paragraph reports a statement to the effect that the epidemicity of poliomyelitis is due to the fumes produced by automobiles. As the announcement is alleged to have been made before the American Public Health Association, public opinion may possibly attach undue importance to it under the impression that it is endorsed by that association. Of course to maintain such a theory it would be necessary to show that epidemics of poliomyelitis did not occur before the development of automobiles, and that they do not occur now in places in which there is little or no such development. Since 1841, when the first epidemic of this disease was reported, though not recognized, in Louisiana, until the present day, a number of these outbreaks have occurred. It will be necessary to mention only some which are inconsistent with the theory advanced in the statement referred to. Such are an epidemic of forty-three cases in 1877 at Stockholm; an epidemic of from 150 to 160 cases in the summer of 1894, in Otter Creek Valley, Vt., and an outbreak in 1899 in Norway. All of these occurred before the development of the automobile industry. In 1905 and 1906, epidemics occurred in Norway with a total of 1,053 cases, especially prevalent in the northern part of Norway. No one will allege that the northern parts of Norway even now, ten years later, are places where poliomyelitis could, by any twist of the imagination, be attributed to "gases and fumes given off in the atmosphere by the combustion of oils and fluids used in automobiles." *Post hoc, ergo propter hoc* is a familiar fallacy; *ante hoc sed propter hoc* is as novel as it is startling.—*Journal of the American Medical Association*, November 4.

THE RELATION OF ALCOHOL AND SYPHILIS TO MENTAL HYGIENE.

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Read before General Sessions, American Public Health Association, Cincinnati, Ohio, October 24, 1916.

Formerly the problem of mental hygiene was considered too large and indefinite a problem to be considered from the public health viewpoint. But if this problem be divided into its constituent parts, most of these parts, considered separately, are manageable. Doctor Williams here discusses two of these groups—alcoholic and syphilitic insanities.

NOT so many years ago an insane person was supposed to be possessed of a devil. A still less number of years ago insanity was considered a moral rather than a physical or psychological disease, and the insane person was supposed to have sinned so seriously that God had turned against him and had taken from him his reason. Until comparatively recent times the field of mental disease has been so enwrapped in an atmosphere of mystery and the supernatural, that it has been considered a field for the metaphysician and the moralist rather than for the physician.

No intelligent person believes today, however, that an insane person is possessed of a devil, and no one believes today that an insane person has in some unusual way transgressed spiritual laws. But there are intelligent people who still believe that disappointment in love, failure in business, masturbation, so-called overstudy and the like are important causes of mental disease. "Mortified pride," "agitation on the approach of matrimony," "metaphysical hair-splitting," "predisposition excited by novel reading," "the complete gratification of every wish of the heart," "changes from ordinary to vegetable and abstemious diet," are some of the assigned causes which are to be found in hospital reports of comparatively recent times. In a quite recent Ohio report, I found Christian Science assigned as a cause of mental disease.

Because of the lack of understanding of the nature of the disease, because of the apparent mystery attached to it, and because of the manifold manifestations of the disease and its apparently manifold causes, mental disease has not been considered a fruitful field for public hygiene. Were the factors formerly assigned as the causes of mental disease the true causes, there would be little room for mental hygiene, for people would continue to make love, to enter into business and to read novels, regardless of the possible danger of mental disease.

But modern methods of study and

research have been applied to mental disease within the last twenty years just as they have been applied in other fields of medicine, and the results have been illuminating. The problem, considered as a whole, is confusing. But, like most large problems, it is found to be divisible into its several constituent parts, and these parts considered separately are in many instances found manageable. I shall discuss but two of these parts: the group of alcoholic and the group of syphilitic insanities.

When we come to discuss the part that alcohol plays in the production of mental disease, we must speak with the greatest caution. There is already current a great deal of misunderstanding and misinformation on the subject. It is of the utmost importance that we distinguish between alcohol as a primary and fundamental factor in the production of mental disease, and alcohol as a contributing or social factor in the production of mental disease. If we confuse the two we shall be wholly misled in the results we may hope to obtain by proper prophylactic measures.

Fifty years ago, before the causes of mental disease were really known, the superintendents of the insane hospitals in the country were united in their belief that alcohol was the chief cause of insanity, and the reports of those years devote pages to the discussion of the havoc wrought in mental life by alcohol. But, as so often happens, a more careful study of the problem has shown that the early reports are inaccurate, due to a frequent getting of the cart before the horse. The excessive drinking of alcohol, which leads to the production of what are known as the alcoholic psychoses, is frequently but a symptom of a previously existing and underlying nervous and mental condition. A comparatively mild, but important type of mental disease, exists in many of these individuals long before they become alcoholic, and their becoming alcoholic is, in fact, dependent largely upon this previous mental condition. The feeble-minded individual who, because of his feeble-mindedness, has less resisting power to social temptations, and who consumes alcohol to the point of developing alcoholic hallucinosis, figures in the statistics of our hospitals as a case of mental disease due to alcohol. Obviously, however, mental disease of a serious kind existed in the individual before he came to the attention of the hospital, and had there been no alcohol for him to consume, he would still have been a case of mental disease in the community, making for inefficiency, creating intricate social problems, and multiplying his own kind. This is one type of individual who is coming to our hospitals with alcoholic mental disease, in whom alcohol is not the fundamental factor. Others are those suffering from mild attacks of manic depressive insanity, certain types of dementia præcox, and the psychoneuroses.

I wish to emphasize this point. If we assume that 20 per cent.—and many enthusiasts have placed the figure at 80 per cent.—of insanity is due to alcohol, and work upon that basis, we are going to find that with alcohol abolished, should the time

come, we shall be disappointed in the comparatively small diminution that will take place in the amount of mental disease in the community. It is obvious, therefore, that the figures which are published today by the majority of our state hospitals as to the per cent. of alcoholic psychoses in their institutions, are not reliable as evidences of the amount of insanity produced by alcohol. That figure would be difficult to obtain, and I do not believe that any exact figure exists today. On the other hand, the figures which are issued annually by the state hospitals are of very great importance in showing the amount of mental disease that it is necessary to care for in our state hospitals at public expense, because of alcohol. Had there been no alcohol in the community, the feeble-minded or neurotic individual who previously had been doing sufficiently well to maintain his place in the community, would not have developed alcoholic hallucinosis, and would not have been brought to the state hospital to be cared for at state expense. This is true of a large proportion of the alcoholic cases brought to the hospitals. Alcohol has not been the fundamental cause of their mental disease, but granting their mild form of mental disease, alcohol has super-imposed a serious condition which has made necessary their care in a hospital. I insist that this is a distinction with a real difference. It is of the utmost importance that in our search for the causes of mental disease we do not confuse cause with effect.

The part that alcohol plays in the fundamental production of insanity we do not know. On the other hand, in the consideration of the more immediately practicable problem,—the amount of mental disease it is necessary to care for at public expense because of alcohol, we do know, and the figures are important.

The hospital reports of Massachusetts from 1910 to 1914 give the following as the per cents. of patients admitted suffering from alcoholic psychoses:

Year.	Per cent.
1910	22.15
1911	19.16
1912	17.40
1913	18.46
1914	18.99

In other words, Massachusetts, during this period, was forced to expend large sums of money to care for persons suffering from mental disease within its borders, and during these years from 17 to 22 per cent. of the patients cared for were brought to the hospitals because of alcohol.

In New York, when a greater effort has been made to sift out alcohol as a fundamental cause rather than as a contributing cause, the per cent. runs about 12. Where alcohol as a contributing factor is taken into consideration, the per cents. are somewhat larger than those in Massachusetts, running from 25 to 30 per cent.

It is difficult to ascertain, from Ohio reports, just what elements have been taken into consideration in reporting alcoholic cases, but the reports give a per cent. of from 15 to 20.

Hospitals in general agree at about the figure 20 per cent. In other words, 20 per cent. of the patients under public care in our hospitals for the insane are there because of alcohol.

In considering the social and economic side of the problem of mental disease, these figures are important and are reliable. In considering the strictly medical and biologic side of the problem, these figures are not reliable; but for our immediate purposes this is not important.

In dealing with syphilitic insanities we are dealing with a much simpler situation, so far as fundamental etiology is concerned. Syphilis, as we know, is no respecter of persons, and it is not necessary for a person to be feeble-minded or otherwise mentally affected in order to contract syphilis or to have syphilis produce a serious and fatal mental disease. The great majority of syphilitic patients in our state hospitals are there essentially because of syphilis. Such other factors as may enter in are of so little importance that they can be disregarded. State hospital figures on the incidence of syphilis are, therefore, of importance.

Ten per cent. of the patients who enter the Massachusetts state hospitals are suffering from syphilitic insanity. Fifteen per cent. of the patients at the Boston Psychopathic Hospital—a specialized hospital where the per cent. would be supposed to be larger—suffer from syphilis. In the New York state hospitals 12.7 per cent of the patients admitted suffer from syphilitic mental disease. In Ohio, 12 per cent. of the patients admitted annually, come because of syphilis. When it is remembered that the Massachusetts state hospitals admit over 3,000 new patients each year, the Ohio over 3,000, and the New York over 6,000, the significance of these per cents. is apparent.

In order to understand, however, just what these figures might mean in an economic sense, Miss Elizabeth M. Walker and myself have made a careful study of 100 patients who have died at the Boston State Hospital of syphilitic insanity. This study has not been wholly completed, but I can give some figures that may be of interest. In selecting our material only those cases in which the diagnosis was verified by autopsy have been chosen, and there was no selection other than this,—the cases being selected in rotation as they came to the autopsy table.

Here were 100 men, engaged in various pursuits. Seventy-eight were married; 22 were single. They were economic units in the community, each supporting himself, and in many cases each supporting others,—each of value to himself, to his family, and to the community. Each made his daily and weekly contribution in the work of the world. Syphilis intervened, with insanity and premature death resulting.

An estimation of the loss of life, based on insurance tables showing the expectation of life, and taking into consideration such factors as race, occupation, etc., shows that the loss of life in individual cases had been from

8 to 38 years. The 100 men lost a total of 2,259 years.

By the intervention of this disease, these 100 men ceased to be productive. The hospital records show the earning power before commitment to the hospital of only ten men, so that the loss of earning power can be estimated for but 10. Previous to their commitment these men were earning from eleven to thirty-seven and one-half dollars a week. The financial loss created by the premature death of these 10 men, based upon the expectation of life and their earning capacity before commitment, was $212,248. But these men not only lost their earning power; they became parasitic upon the community. The hospital residence of the 100 men amounted to a little over 126 years, or an average of a little over one year apiece. This, at the cost of six dollars per week to the state of Massachusetts. For the maintenance of these men, the Commonwealth of Massachusetts expended over $39,312.00. By the intervention of this disease, wives and children were left unsupported. Wives were left to shift for themselves and to care for their children unaided. The continuity of the home life was destroyed; the children who should have continued in school in preparation for their life in the community, were turned out at an early age upon the community, either to work in unskilled labor for the support of themselves and other members of their family, or as public charges in charitable institutions. One hundred and nine were so left. A not unimportant per cent.—this per cent. has not yet been determined—were diseased, and thrown upon the community in a crippled condition, their disease being directly due to the infection of their fathers.

These are figures—2,259 years' loss of life; $212,248 loss of earning power (10 men); $39,312 expended by the state for support; 109 children cheated of their rights of home protection—for but 100 male patients in a representative hospital, but from them we may gain some notion of the tremendous loss to the community each year due, and due entirely, to syphilitic mental disease.

Mental disease constitutes a serious public health problem. Massachusetts in the last ten years has received over 26,000 *new* patients into her state hospitals. They come at the rate of over 3,000 *new* patients each year. In the last ten years, Massachusetts has expended over $35,000,000 in the maintenance of these individuals. Twenty per cent. of the patients who have come have come because of alcohol; 10 per cent. have come because of syphilis.

The state of New York receives over 6,000 *new* patients each year, and in the last five years has expended over $37,000,000 in their maintenance. Approximately 25 per cent. of these patients have come because of alcohol or syphilis.

Ohio receives 3,000 *new* patients into its hospitals each year, and in the last three years has expended close to $13,000,000 in their care. Twenty to 25 per cent. of these patients have come because of alcohol or syphilis. Massachusetts, New York and Ohio

have expended over $80,000,000 in the last five years for the maintenance of patients in their insane hospitals, and from 25 to 30 per cent. of the patients in these hospitals have come because of alcohol or syphilis.

There are today in the state of Massachusetts 1,500 professional men and women, business men and women, artisans, laborers, going about their various pursuits and pleasures, who in the next five years will be committed to some state hospital suffering from syphilitic mental disease. This figure is not a guess. It is easy of computation. It is below rather than above the actual figures. It is based upon the average admission rate to the Massachusetts hospitals for a period of years—and the rate of admission each year increases rather than remains stationary or decreases—and the per cent. of syphilis in the yearly admissions, a figure that tends to remain comparatively constant. There are 3,000 people in Massachusetts now about their work, who, in the next five years, will be committed because of alcoholic insanity. Within the boundaries of the state of New York, there are over 6,900 persons now at their business, who will be taken to the state hospitals of New York in the next five years suffering from either alcoholic or syphilitic insanity. In Ohio, there are 3,000 such persons. In the three states of Massachusetts, New York and Ohio, over 14,000 persons, who are now productive units, will, on account of syphilitic or alcoholic mental disease, be withdrawn from the community in the next five years, and taken to the state hospitals for the insane, where most of them will be supported at public expense.

This is a situation that cannot long be ignored. Alcoholic and syphilitic insanities are as unnecessary as typhoid fever.

Alcohol is clearly an important exogenous factor in the production of mental disease; we must not forget, however, the endogenous nature of much of the so-called alcoholic psychoses. Effective prophylactic measures will deal with both ends of the problem.

Time will not permit a discussion of the prophylaxis of syphilitic mental disease. I would make but two points. First: it is time that, as students of public health, we ceased to lay the emphasis upon the venereal nature of syphilis, which, after all, is its least important part, and put the emphasis where it belongs, upon the fact that it is a contagious disease. Second: to use current expressions of the day, it is time we stopped "pussyfooting about" in our dealing with syphilis, that we stopped "mollycoddling" the disease, and that we placed it where it belongs—in the category of such diseases as smallpox and leprosy—and treated it accordingly.

The number of suicides reported for 1915 by the U. S. Bureau of Census was 11,216, or 16.7 per 100,000 population. The suicide rate has not varied very greatly during the past ten years.

THE RELATION OF SOCIAL AND ECONOMIC FACTORS TO MENTAL HYGIENE.

C. MACFIE CAMPBELL, M. D.,
Johns Hopkins Hospital.

Read before General Session, American Public Health Association, Cincinnati, Ohio, October 24, 1916.

The causal factors of mental disorder or maladjustment are either in the individual himself, or environmental. It is with this later case that the author chiefly deals, and calls to our attention some of the factors in our social organization which touch upon the problem of the formation of habits of adjustment, and which determine the nature of the environment to which the individual must adjust himself.

MODERN medicine is largely preventive in its ideals, and the student in his researches must be ready to go beyond the individual to the study of the complex environmental factors, which play such an important rôle in the occurrence of disease. In no department of medicine is the preventive aspect more important than in psychiatry, that branch of medicine which deals with mental disorders. Psychiatry does not merely include the study of "insanity," a term which has more legal than medical significance; it embraces a wide range of disorders, the pathological nature of some of which is frequently ignored, while others are not honestly called mental disorders by the physician in view of social prejudice.

Thus neurasthenia is a mental disorder, whether the relatives like the fact or not; so is hysteria; as examples of mental disorders not recognized as such may be cited many cases of ill-balanced enthusiasms and fads, of marital incompatibility and family estrangement, of prejudices and infatuations, of revolt and intolerance, of day-dreaming and unproductive endeavor.

The causal factors of both the mild and grave forms of mental disorder or maladjustment may be chiefly in the individual, or may be largely environmental; where the cause lies more especially with the individual there may be at least two very different sources of the disorder. The disorder may arise on the basis of some structural or nutritional damage to the central nervous system; on the other hand, the disorder may be the culmination of very faulty habits of adjustment, the onset being precipitated by some definite situation.

To outline the most favorable environmental conditions, and to formulate the rules of hygienic conduct, would mean to sketch a new utopia and to give a counsel of perfection..

Our present task is more modest; it consists in calling attention to some factors in our social organization, which touch the problem of the formation of habits of adjustment, and which determine the nature of the

environment to which the individual has to adjust himself.

For efficient adjustment to the complex demands of the environment a certain constitutional equipment is requisite, and many individuals lack this necessary equipment owing to poor hereditary endowment. The infant science of eugenics is probably better utilized in sober education of the conscience of the community, than in the promotion of fantastic legislation; but even with our present knowledge an intelligent community should make it impossible for any civil sanction to be given to such outrages as the marriage of an insane girl to a purchased bridegroom, or the marriage of an imbecile girl to a degenerate man.

With regard to those disorders of adjustment where the difficulty lies chiefly with the individual, reference may be made to two preventable forms of organic brain disease, namely to brain disease caused by syphilis and to that caused by chronic alcoholism. The social and economic factors which favor the spread of syphilis and the development of chronic alcoholism demand the attention of the community. To stimulate the intelligent coöperation of the community the relevant facts must become widely known; for instance, it would be well for the thoughtful citizen to know that in one metropolitan area every fifth male patient admitted to the hospital for the insane is suffering from syphilitic brain disease. But how can the knowledge be placed before a community which is unwilling to face disagreeable truths? The daily papers of New York City, almost without exception, in reporting a conference on mental hygiene, did not dare to print the word syphilis lest their readers should be offended. This atmosphere of timidity in the face of serious hygienic problems is a social factor which tends to postpone the development of better sexual standards.

With regard to the problem of chronic alcoholism it is gradually being recognized how interwoven it is with complicated social and economic conditions.

If we pass from the disorders due to organic brain disease, and consider the vast group of cases where, without gross disorder of the brain, the individual shows a disorder of his social adjustment, either mild or grave, temporary or permanent, the situation is very complex; only a few salient points can be briefly referred to within the limits of this communication. In some cases the influences that mould the habits in the formative period have been inadequate or even detrimental; in other cases adult opportunities of satisfaction have been inadequate, or on the other hand the individual, from nature or lack of training, has been unable to utilize the opportunities available. Thus those balancing interests, social, æsthetic and religious, which carry one through periods of uncongenial work or of disillusionment and sorrow, may never have been cultivated, or unassisted may not find an opportunity for their exercise; adaptation to the demands of married life and of parenthood may have been hampered by early experiences, false attitudes, dishonest conventions; in the declining years of

life the emancipation of the family may leave the parent stranded without individual resources of interest and occupation. The problems of mental hygiene, illustrated by the above remarks, take one into a complicated social and economic field, and each one furnishes occasion for much patient research.

The factors which influence the formation of habits in youth, and thus help to determine the later ability to meet the various tests of adult life in a healthy manner, are chiefly the atmosphere of the home and of the school.

At present the home and the school are unhappily divorced; their closer union is much to be recommended, for in the school organization the community has the necessary apparatus for making the parents somewhat familiar with the best methods and the issues involved. In order that the desirable continuity between the home life and the school life may be established, parents and teachers should meet from time to time. For the teachers to be of use in such relations, they require to have a sound biological attitude towards the training of the young, and to be familiar with the outlines of child psychology and psychopathology; the gerund-grinder is an anachronism. It is obvious that teachers with such qualifications are entitled to suitable remuneration, probably beyond that of the present standards. An intelligent community, however, will face this item in the budget, recognizing that cheap education is false economy. The association of a special clinic with the schools should lead to the early recognition and special management of neurotic and subnormal children. In this way the parent, teacher and school physician may coöperate in checking the development of unhygienic habits, faulty attitudes, and emotional anomalies.

Where a community pays its teachers mean salaries and restricts equipment, and the task of the teacher consists in handing out to absurdly large classes a traditional body of information to absorb, the adolescent leaves the school with poor habits of thought, with the tendency to replace thoughts with words and to accept with little criticism the dicta of authority, with little training of character and of personal judgment, and without having found himself in the sense of realizing his special aptitudes and thus getting some direction for his adult occupation. To enter haphazard into the first occupation at hand is risky for the individual and uneconomical for the community. The individual risk is increased when the adolescent passes from the school into the rôle of wage-earner with no training for social adaptation, with narrow interests, with valuable aspects of his nature neglected.

The modern highly specialized division of labor means that many workers have tasks of the most mechanical and monotonous nature; industrial hygiene is much concerned about the lungs, the blood and other organs of the workers, but that the task is soul-deadening appears to be of little interest. Mental hygiene cannot ignore that fact; for it aims to develop those qualities which give to human life its value and without which the preservation of the most superb physique loses all its

meaning. Mental hygiene aims to supplement and thus to justify physical hygiene.

Employers of labor might well be encouraged to take an interest not only in the ventilation of their factories, but also in the moral atmosphere which is so important for their employees; psychologists may come to be employed not only in the interests of the employer to increase the workers' industrial value, but in the interests of the workers to increase their value as individuals.

Mental disorders tend to thrive on the soil of faulty habits and unsatisfactory environment; with uncongenial occupation, with sources of recreation limited through lack of training in appreciating the harmonies of life, with sense of personal and civic responsibility uncultivated, with no clear realization of the sound basis of good sexual standards, the continuation of healthy adjustment depends altogether on original constitution and luck. To them the individual will owe his preservation from sexual indiscretions, from injudicious mating, from drifting into aberrant methods of satisfaction such as chronic alcoholism. In the face of any special stress or strain due to the vicissitudes of life, his training has done little to safeguard him by developing those balancing factors which are so important, the feeling of social solidarity, outlets for healthy intellectual and æsthetic interests, and a religion which may or may not conform to that of any denomination, but which brings him into some fellowship, inspired by ideals of service.

In trying to find the best means to aid his patient in regaining mental health or avoiding a breakdown, the physician is disheartened by the lack of available social organization. It is easy to give the patient general directions, to talk of recreation, of increasing his social affiliations, of taking some part in altruistic work. Where the individual is closely attached to a religious body, he may find in its various activities a congenial opportunity for the cultivation of many interests and from his religious director derive support and stimulus. But with many patients religious affiliations have very formal value, and modern society has not replaced the support and comfort of the religious organization by adequate substitutes. For the better educated and privileged classes opportunities for healthful recreation, social intercourse and stimulating intellectual activities may be satisfactory. For the poor the situation is different; the various possibilities of satisfaction for the many-sided demands of our nature, which are available for the privileged, are here reduced to the saloon and the moving-picture theatre; with many no training has enabled them to make use of the art treasures, the musical performances or other recreative possibilities of their environment. When we look for an opportunity of useful social affiliation, frequently no neighborhood organization exists, and no suitable member of the community is available to act as spiritual director. This lack of social organization makes it difficult for the patient, who has recovered from a mental disorder, to get that satisfaction from varied and healthy activity

in contact with his fellows, which is the best guarantee against the return of morbid moods and individual fancies.

While many women have the same industrial life as men, the large majority find their sphere of activity in the home. The care of children forms a large part of their work, and is of vital importance to the community; yet here, too, as in the case of education in general, the individual receives little training for the adult task. A task which is of supreme importance for the community is left altogether to the instincts and the casual information of the individual. To the intelligent woman few subjects could more readily be made to combine deep scientific interest with great practical importance than the study of the development and training of the child, a field which at the present moment urgently demands wide and intensive research. But in women's colleges there is as a rule no place in the curriculum for this subject. The time may come, however, when the intellectual woman will not feel that the nursery is an unwelcome drag on her higher aspirations, but will see in it a great opportunity for the congenial employment of her intellect. Few fields of scientific research offer more tempting problems at present than the nursery.

The same principles which have been discussed in relation to the productive period, find further illustration in the declining years of life. Then, as earlier, the individual craves satisfaction for his human needs, but the objective sources of satisfaction are becoming limited, the outlook is more restricted, hope no longer is an anodyne for the pain of unsatisfied longings. Even in the absence of any wasting of the brain tissue, adjustment tends to become more difficult, and there may develop querulous discontent, unjustified suspicions, despair as to the future, subjective creations in the place of objective grasp. In many cases the disorder depends on the limited resources of the individual, which have been developed by no social training, and have not been stimulated by the existence in the community of suitable social centers. Such mental disorders are not limited to any community, but affect the farmer and his wife on the lonely farm, the housewife and the worn-out industrial unit in the crowded city.

Each community has its own needs and its own opportunities, and in working out its problems will do well to utilize those agencies which already do such good work on an individual basis.

The optimist looks forward confidently to the time when each community will take its mental hygiene as seriously as its physical and industrial hygiene, and when it will point with no more pride to the cheapness and excellence of its industrial products than to the mental health and happiness of the men and women who make these products.

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In Petrograd, during 1915, 250 out of every 1,000 children born died during the first year.

REGISTRATION OF MENTAL DISORDERS.

A. J. Rosanoff, M. D.,
Kings Park State Hospital, Kings Park, N. Y.

Read before the Vital Statistics Section, American Public Health Association, Cincinnati, Ohio, October 25, 1916.

Doctor Rosanoff in this excellent paper presents, for our consideration, facts which in the future must yield the coöperation between the psychiatrist and the public health official.

IN THE traditional ideal of medicine all disease,—congenital or acquired, whether caused by infectious agents or otherwise,—all should be prevented, if possible. Practical hygiene has, however, not concerned itself equally with all conditions of ill health: its preoccupation has been with its best and most obvious opportunities. Thus it has heretofore concentrated the bulk of its energies upon the struggle against disease of exogenous origin, especially infectious disease; and the wisdom of such a course has been amply attested by the results attained.

As for the future progress of hygiene, it would seem inevitable not only that its struggle against exogenous factors of disease shall grow to be better organized and more successful, but that its scope, too, shall increase so as to include the more intangible endogenous factors. At least it is safe to say that, as far as mental disorders are concerned, the work of prevention could not be efficiently organized without taking full cognizance of the endogenous factors in their causation. I might add, for the benefit of those who are not psychiatrists, that this statement implies more than might appear on the surface; for in the field of mental disorders it is perhaps more true than in any other that prevention is better than cure, if, indeed, there is at all such a thing as cure, save by way of rare exception; in other words, aside from prevention there seems to be but little relief in sight beyond mere palliation.

In connection with the main topic of this paper,—the registration of mental disorders,—the questions which arise are, Is registration here, as in the case of infections, likely to be helpful in work of prevention? If so, what cases should be registered?

Among the endogenous causes of mental disorders by far the most important is bad heredity; and the task of prevention here consists in stopping, as far as may be possible, the hereditary transmission of undesirable mental traits. It seems plain that in undertaking such work the first step must be the compiling of a list of cases in which such undesirable traits exist; special measures to be instituted may then be taken under

consideration either for groups of cases or for individual cases, according to indications as they may arise.

Of all measures that have been proposed for the prevention of the hereditary transmission of undesirable traits, it seems now probable that segregation in institutions will prove to be the one that is both effective and practicable. Every state in the country is now constructing facilities for segregation. As the cases to be segregated differ so greatly in their nature, the types of institutions required also differ. The possession of a fairly complete register, and that alone, could afford for each state a basis for adequate and intelligent planning of a comprehensive system of mental hygiene, including legislation, establishment of hospitals, training schools, and industrial colonies, and any other measures that may suggest themselves.

Segregation is nothing but a special extension of the principle of quarantine and holds nothing essentially new to those who are in public health work.

It seems to me that it may be safely concluded that our first question,—Is registration of mental disorders, like that of infections, likely to be helpful in work of prevention?—is to be answered in the affirmative.

Let us now proceed to the consideration of the second question, which is not so easily disposed of, What cases should be registered? The practicability of the plan of registration is dependent on finding a suitable answer to this question.

The current conception of mental disorders, especially as held by the medical profession, views them as a group of diseases analogous to physical diseases. The fault with this conception is that it leads to an overemphasis of this analogy,—which in fact is very imperfect as far as the majority of cases is concerned,—while the true nature of mental disorders thus fails to receive proper consideration.

The fact is that, aside from such conditions as general paresis, cerebral arteriosclerosis, brain tumor and cerebral traumata, mental disorders are for the most part constitutional in their nature; and, although they are capable of being even more distressing and disabling than rheumatism, cirrhosis of the liver, tuberculosis, or other typical diseases, their nature is far more closely analogous to that of biological traits like color of skin or hair, stature, and color of eyes.

The current conception of mental disorders implies the notion that a sharp line of demarcation is to be drawn between mental disease and mental health and between the several varieties of mental disease which it is customary to distinguish. Just as, by means of proper diagnostic technique and skill, we are able to tell whether or not a person has typhoid fever or cancer of the stomach, so, it is implied, we should be able to tell whether or not a person has a manic-depressive psychosis, or paranoia, or dementia præcox. The fact is that these and other conditions are but extreme members of series of temperamental variations and are connected with one another and with the average or so-called "normal" condition by innumerable transitional

forms, so that there can be no question of lines of demarcation except such as might be drawn arbitrarily.

Finally it is to be noted that the current conception of mental disorders has led to a concentration of the bulk of our energy on mental therapy rather than on mental hygiene.

It is true that great progress has been made in the matter of segregation of mental disorders, but it is remarkable that such segregation has been entirely incidental, being dictated in each case by immediate necessity or expediency and not by a deliberate policy of prevention by way of eugenics. Thus, even in the most highly organized states, segregation has come to be looked upon as a necessary evil, to be reduced in amount as far as may be possible, while, as a matter of fact, it is nowhere as yet as complete and as thorough as it should be.

In the present connection we must ask ourselves the question, Is the current conception of mental disorders, together with its resulting classifications, the best available guide for the enterprise of registration?

There are many reasons why the answer to this question must be in the negative.

One of these is that there are well authenticated cases of manic-depressive psychoses, epilepsy, and other constitutional disorders in persons who have been among the epoch makers and leaders of the world in literature, art, science, and statesmanship; and it is, of course, vastly more common to find similar mental disorders in persons who are in humbler walks of life but who are, nevertheless, useful, attractive, and in every way highly desirable members of their communities. From the standpoint of society at least the eugenical policy in relation to such cases would be the very opposite of that which might be advocated in relation to other cases of the same mental disorders but characterized by disablement or by antisocial tendencies.

Another reason is that a host of abnormal, undesirable, and even dangerous constitutional traits have found no place in medical classifications because they could not, even by forced analogy, be included under any category of disease. The existence and wide prevalence of such conditions have forcibly presented themselves to us in the course of a survey of mental disorders in Nassau County, New York, undertaken by us about four months ago under the auspices of the National Committee for Mental Hygiene. We are able to mention specifically cases of criminal tendency, sex immorality, shiftlessness and dependency, and marked inebriety, occurring quite apart from insanity or feeblemindedness as generally defined, yet plainly dependent on inborn and persistent psychic anomalies.

What, then, should be accepted as the guiding principle in the proposed enterprise of registration of mental disorders?

Our experience has led us to feel that the best case is to be made out for the sociological principle. The mind is nothing but an instrument of adaptation of the organism to its environment; and for practical pur-

poses it would seem necessary but to take cognizance of instances of maladaptation sufficiently marked to come to the notice of public officials, charitable organizations, and physicians.

More specifically, the register in each state may include:

1. Cases admitted to hospitals for the insane, public or private.

2. Cases admitted to institutions for inebriates, epileptics, and the feeble-minded.

3. Cases convicted of any crime, exclusive of violations of local laws or ordinances.

4. Cases coming to light in suits for separation or divorce.

5. Cases admitted to almshouses.

6. Cases applying for outdoor relief to overseers of the poor or private charitable organizations.

7. Cases of marked backwardness, truancy, or unruliness in the public elementary schools.

8. Cases of children in orphanages, boarded out and dependent on town or county, etc.

9. Mental cases coming to the notice of physicians in private practice.

Each individual thus registered should receive an identification number, so that future instances of maladaptation reported in his case would be added to his record and not be registered as new cases.

The first registration, it need hardly be said, would by no means imply in all cases a judgment of mental abnormality. It is obvious, on the contrary, that a register containing all such cases will include many of quite normal individuals. The object of compiling the register in the manner here proposed would be to make sure of including all cases of marked maladaptation and yet avoid a premature judgment as between normality and abnormality.

Where the maladaptation is slight or transitory and possibly to be attributed to unusually difficult combinations of environmental conditions, the data recorded in the case should be sufficient to show it; furthermore, in such cases other instances of maladaptation will not be likely to appear in the course of years against the individual in question; whereas in cases of individuals truly lacking in power of adaptation by reason of poor mental endowment other instances of maladaptation will keep appearing in the record.

Judging from the results of the Nassau County Survey, which has already been referred to, it may be anticipated that after several years' development such a register will show that the bulk of all crime, vice, dependency, and other maladaptations in a given commonwealth is attributable to a comparatively small fraction of the population. Naturally, problems of dealing with such social evils could be much more successfully attacked with the aid of material that would be available in such a register than without it. It is but necessary to realize that such problems are susceptible of scientific treatment, that they are in the truest sense problems of public health and not to be solved in the courts of justice or through the bounty of charity. There is a wide and fertile field here for the coöperation

of the psychiatrist with the public health official.

The idea of registration of mental disorders was suggested to me by Dr. Louis I. Dublin; it appealed to me immediately for reasons which seemed to me very obvious and which I have expressed in this paper. Some time later I was agreeably surprised to learn that this idea had already received the sanction of so competent a body as the British Royal Commission on the Care and Control of the Feeble-Minded and that, furthermore, the details of the proposition, as outlined by the Royal Commission, are almost exactly like those outlined in my paper. Their recommendation reads: "That it be the statutory duty of the Medical Officers of the Local Education Authorities, of the Guardians of the Poor, and of the Public Health Committees, the Relieving Officers of Boards of Guardians, the Medical Officers of Convict and Local Prisons, the Police, and the Managers of any Homes for Inebriates or any Charitable, Religious or Voluntary Institutions or Societies, or any Naval or Military Authorities, to notify to the Committee all cases of mental defect coming to their knowledge in the course of duty."

You will note one important point of difference between the Royal Commission's proposition and mine, namely, that the judgment as to mental defectiveness is in the Commission's recommendation left to the various agencies dealing with dependency, crime, etc., whereas in my paper it is proposed that the system of registration should not be dependent either on the judgment of such authorities or even on that of persons better equipped, but that the object of registration should be the accumulation of material which should render possible at any time an independent judgment in accordance with the existing status of psychiatry.

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PELLAGRA NOT TRANSMISSIBLE.

Owing to a belief widely held that pellagra is a communicable disease, experiments were performed under Surgeon Joseph Goldberger upon 16 volunteers, varying in age from 26 to 42 years. Quoting from *Public Health Reports*, November 17,—

"Seventeen cases of pellagra of various types and of different grades of severity furnished some one or more of the experimental materials.

"The materials were blood, nasopharyngeal secretions, epidermal scales from pellagrous lesions, urine, and feces. Blood was furnished by 4 of the cases, nasopharyngeal secretions by 4, epidermal scales by 5, and urine or feces by 16, of whom 10 furnished both urine and feces, 3 urine without feces, and 3 feces without urine.

"Blood was administered by intramuscular or subcutaneous injection: secretions by application to the mucosa of the nose and nasopharynx; scales and excreta by mouth.

"Both urine and feces were ingested by 15 of the volunteers, 5 of whom also took blood, secretions, and scales.

"Observation has been maintained by association with a majority of the volunteers and by visits of inspection, supplemented by reports from the volunteers themselves, 13 of whom are physicians, and by reports from other medical officers of the service with whom they are associated. During a period of between five and seven months none has developed evidence justifying a diagnosis of pellagra.

"These experiments furnish no support for the view that pellagra is a communicable disease; they materially strengthen the conclusion that it is a disease essentially of dietary origin, brought about by a faulty, probably 'deficient,' diet.

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THE STANDARDIZATION AND CONTROL OF THE BUBBLE FOUNTAIN.

With the almost universal condemnation of the common drinking cup has come a very general acceptance of the so-called bubble fountain as a substitute. It is somewhat disquieting, therefore, to find an epidemic of streptococcus tonsilitis traced to infected bubble fountains, and to learn that over fifty per cent. of all the bubble fountains in the institution where this outbreak occurred showed the presence of streptococci, varying from a few chains in some fountains to an almost pure culture in others.* And one's faith in the bubble fountain as an agency of hygiene will not be strengthened by learning that B. prodigiosus introduced either by means of a pipette or by the moistened lips into an experimental bubble fountain remained in the water from 2 to 135 minutes.

These observations, however, merely serve to bring home what should long ago have been patent to even the most superficial observer, and that is the necessity for official standards of construction and performance for bubble fountains. The designs of the fountains now on the market, and the principles governing their construction and operation, have been limited only by the ideas of their designers and manufacturers, although clearly the very laws and regulations that have driven out the common drinking cup should have prevented the introduction of a substitute even more dangerous. The investigators of the institutional epidemic of streptococcus tonsilitis referred to above, which they traced to the bubble fountains on the premises, claim that the danger in such devices lies to a certain extent in the delivery of the water in a vertical column and that such

* The Bacteriology of the Bubble Fountain, by Pettibone, Bogart, and Clark, *Journal of Bacteriology*, September, 1916, page 471.

danger can be avoided by delivering the stream at an angle, say 50 degrees, from vertical. If their observations in this respect be verified, an easy means of avoiding danger is apparently already available. But in any event there should be a speedy examination of the bubble fountains now in use or on sale and prompt action taken to prevent the use and sale of such as are liable to spread disease.

TWO NEW SERVICES.

It is with pleasure that the secretary of the American Public Health Association draws attention to the creation of a Health Information Bureau for the use of members of the Association and subscribers to the JOURNAL. A notice to this effect has been published in the advertising pages of the JOURNAL in previous issues and already considerable interest has been shown and questions of various kinds propounded and answered. The service necessarily has limitations; questions are asked which are unanswerable; questions dealing with controversial and uncertain topics cannot be positively and completely answered; information is desired which can only be obtained by the expenditure of money not now available for this purpose.

One of the chief functions of the Bureau is to put people who are in search of information in touch with people who, by training and experience, are in a position to adequately supply the needed facts. The office of the Association is peculiarly fit to perform this latter service, being more or less well acquainted with the lines of work which the members of the Association are engaged in.

It is of course apparent that the opinions rendered by this new Bureau are not to be taken as the official opinion of the American Public Health Association and this point is made plain to all inquirers. It is hoped that many will avail themselves of this service.

Another important but more uncertain step is the formation of a Health Employment Bureau for the members of the Association. Many, especially the younger members, have suggested that the Association might act as a clearing house for positions in the various branches of the health services, and be in a position to put employers in touch with men and women who by training and experience are qualified to fill positions as health officers, laboratory workers, social workers, public health nurses, statisticians, food and drug inspectors, epidemiologists, industrial hygiene workers, milk inspectors, etc.

With this in mind a letter has been addressed to all members of the Association acquainting them of the formation of this Bureau and inviting them, if they so desire, to register. A second letter is to be sent to as many potential employers as possible so that they may be stimulated to call on the office of the Association for lists of qualified persons when they have vacancies or new positions to fill.

Frankly this Employment Bureau is experimental in nature, but if members and employers will coöperate and give the plan a try out it can shortly be determined whether such a Bureau fills a need or not.

MALARIA AS A PUBLIC HEALTH AND ECONOMIC PROBLEM IN THE UNITED STATES.

JOHN W. TRASK,
Assistant Surgeon General, United States Public Health Service.

Read before the General Session, American Public Health Association, Cincinnati, Ohio, October 27, 1916.

Malaria constitutes one of the big national health problems, and because it is a common disease, it receives less consideration than many other diseases less destructive. Doctor Trask here discusses the past and present distribution of this disease and the necessity for an organized fight against it.

IT IS human nature to fear the unusual and the unknown. Few give due attention to the commonplace affairs with which they have become familiar. An exotic disease which threatens invasion or an occasional malady of which little is known will arouse a general interest, while ailments which are widely prevalent and are thoroughly understood receive the most meager attention. Plague, leprosy, or typhus fever arouses to instant activity the press, the people and the health authorities, while commoner diseases, though more destructive, receive far less consideration.

The purpose of health departments is to promote the welfare of the people by securing them against unnecessary exposure to disease. Their duty is to prevent the preventable conditions which produce disease. It would seem logical then to devote first attention to the conditions which our present knowledge shows to be surely preventable, and of these, primarily to those which offer the fewest obstacles to control. If, of such disease-producing factors, we have any which at the same time are affecting large numbers of people, they would seem to demand our first efforts. Malaria is a disease produced by such conditions.

To fear death and the diseases associated with death and to give less consideration to the ailments which are not directly mortal, are common characteristics. Malaria is not commonly a terminal condition associated with death, and has aroused little of the interest usually associated with more directly fatal morbid processes.

It is not commonly realized that each attack of disease does some injury to the human machine, leaves some organ weaker than it was before and lessens the time during which the body can continue to resist the destructive agencies in its environment. The terminal illness is not usually the one which has been the deciding factor in determining the individual's length of life. It is frequently but the last inimical process to attack a weakened human organism, an organism exhausted and with diminished resistance as a result of previous diseases and morbid processes. Malaria

is a potent factor in determining the average duration of life in areas where it is endemic. This influence is not only one directly affecting the individual, but it also has its effect on the offspring. A mother suffering from chronic malaria cannot satisfactorily nurse her child. Nor will the child have had the same prenatal advantages as the offspring of a healthy parent. Then, too, a malarious father will not be so likely to furnish a suitable economic status for the family. Malaria is not alone a health problem. It is equally an economic problem, which merits consideration aside from its relation to health.

Former Prevalence.

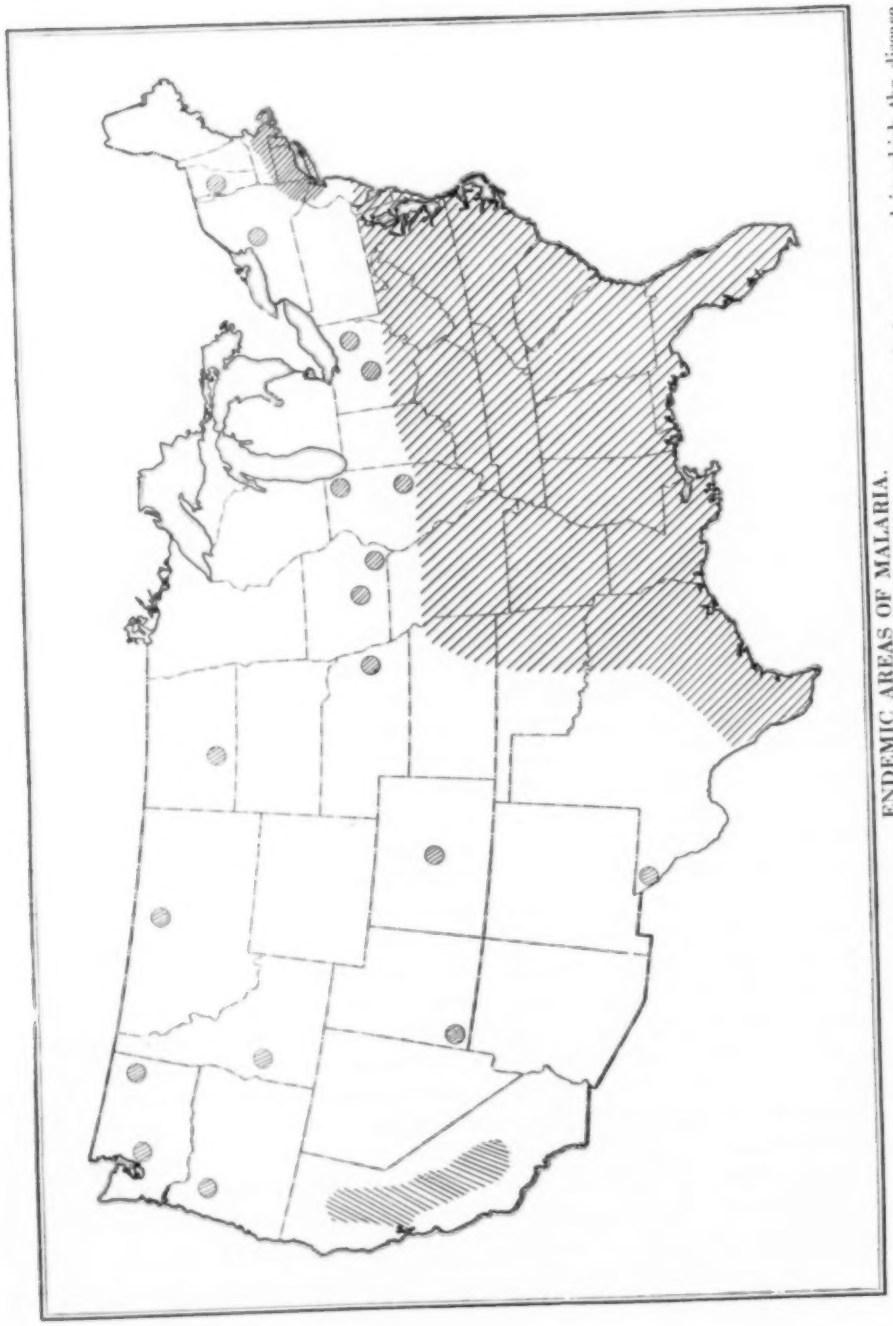
At one time malaria was endemic over a much greater area of the United States than it is today, and in many sections where it is still endemic its prevalence has greatly diminished. Fifty years ago the disease prevailed farther north than it does now. The endemic area extended to the great lakes and into Canada. Ague was in this section the most common of ailments and quinine the most universal of household remedies. The early literature indicates that the disease was formerly more or less prevalent also in Iowa, Minnesota, the Dakotas, Utah, Colorado, Montana and Wyoming.

The northern boundary of prevalence has gradually receded, leaving here and there more or less localized endemic foci. Why it has disappeared from large areas and clung to certain localities is largely a matter of conjecture, although a careful study of conditions would probably explain the apparently perplexing phenomenon. It would be of interest to explain satisfactorily why it has all but disappeared from Wisconsin and Michigan, two states at one time badly infected, and still persists in certain sections of New England. The underlying reason for the recession of the northern boundary of endemicity is probably that, other things being equal, the conditions necessary to the perpetuation of the disease are found increasingly favorable as one approaches the equator and the disease is disappearing first from the localities where the climatic conditions are the least favorable to it.

Malaria is also diminishing in many localities of the south. The reasons for this, given by Doctor Carter, for one locality and based upon personal observation, were: (1) The improved economic status of the farmer, which made possible better housing and a better environment generally. (2) The more extensive cultivation of the land, with the consequent better drainage and fewer collections of standing water in which the mosquitoes can breed, and the cleaning of brush and other wild growth in which the mosquitoes find shelter. (3) The more general use of quinine, which has become a household remedy and is taken freely in all cases with chills or fever as well as for other symptoms of illness.

Present Prevalence and Geographic Distribution.

The impossibility of knowing the prevalence or virulence of a disease in the absence of the systematic re-



ENDEMIC AREAS OF MALARIA.

Shaded portions of map show endemic areas. Shaded circles represent localities in which cases of malaria occur and in which the disease is probably endemic.

porting of cases or the making of intensive sickness surveys of the population is especially well illustrated in malaria. There are few diseases to which health departments have given so little attention. Seven years ago letters were sent by the United States Public Health Service to the health departments of the states in which malaria was supposed to be most prevalent, asking for information as to the distribution of the disease in the several states, but the information was not available. The same lack of information has been in large measure true of cities. Health departments as a rule do not come in contact with malaria, and to them the disease seldom projects itself as a problem. In a population heavily infected with malaria a few cases of smallpox cause immediate measures for control, while the malaria is entirely ignored although usually of far greater import.

Nor is the opinion of the practicing physician as to the prevalence of the disease in a locality much better than that of the health department, although he comes into direct contact with cases and might be expected to know existing conditions. Assistant Surgeon General H. R. Carter, in reporting on an investigation of a particularly malarious locality in the south, stated:

". . . At no place was I able to obtain any definite statistics as to the prevalence of malarial fever there, not even as to its comparative prevalence or its virulence. Each physician had an impression that it was 'much' or 'little,' 'less than' or 'more than,' or 'about the same as' the last five or ten years. It was 'not very malignant' or 'showed many bad cases' in the opinion of different men. I could not determine the number of cases, even approximately, in any community. . . ."

Also, in speaking of his observations of the prevalence of the disease in a section of North Carolina, a locality probably typical of the areas where the disease is most prevalent, Carter described the conditions as follows:

"In the absence of statistics I can only say that there is much malaria in eastern North Carolina, mainly of a rather mild type, tertian, but there is some estivo-autumnal. There is some in every town I visited, generally in proportion inversely to its size, but varying, of course, with its environment. There is much more in the country, and of severer type, than in the towns. In days not long gone by there was a large amount of extremely severe malaria in this section, not less than there was in the Canal Zone, and there is from report not a little now, especially blackwater fever and malaria of the cerebral type, in some rural districts and villages.

"In most districts in the tidewater region but few people living in the country can attain the age of, say, 30 years, without malarial attacks enough to acquire a high degree of immunity, like the natives on the Isthmus and other malarial localities. Those who did not attain a fair degree of immunity would probably not attain adult age. The prevalence of malaria, then, is most injurious to children, who are, of course, newcomers, during the time they should be getting

their growth and education, and it gives them a permanent handicap in life."

Anopheline mosquitoes capable of spreading malaria are to be found in all sections of the country from the Canadian to the Mexican borders and from coast to coast.

The Public Health Service has for the last four years circularized the physicians of most of the southern states to ascertain as definitely as this means would allow the prevalence of the disease. To determine the geographic distribution of the disease elsewhere, recently circular letters of inquiry were sent to the health departments of all the other states and of cities of over 10,000 population. The records of the occurrence of malaria at army posts were also consulted. The mortality records of the registration area for deaths were examined but gave little information of value for the reason that malaria may be prevalent without appearing in the records of deaths. This is illustrated by the fact that between 1904 and 1914 there were in the army in the continental United States, exclusive of Alaska, over 13,000 cases of malaria while during this time there were only two deaths due to the disease. Between 1907 and 1914 there were over 7,000 cases without a death. Then, too, in civil life malaria frequently is given as a cause of death when the deceased was affected with some other condition and not malaria. This is true both in malarious localities and in localities where the disease does not exist. And as malaria appears comparatively infrequently in mortality records at most, it is impossible by this means to separate malarious from nonmalarious localities.

As to the geographic distribution of malaria in the United States at the present time, there are three principal well recognized endemic areas, one large area and two smaller ones. The large endemic area covers the whole southeastern portion of the United States, having for its southern boundary the Gulf of Mexico; for its western boundary, a line drawn from Eagle Pass on the Rio Grande to Leavenworth, Kansas; for its eastern boundary, the Atlantic seaboard; its northern boundary, a line drawn from Leavenworth, Kansas, eastward some distance north of the Ohio River and extending to the Atlantic on a line with the northern boundary of Maryland. Of the two smaller endemic areas, one includes a section of the northern part of New Jersey, southeastern New York, Connecticut, Rhode Island and part of the state of Massachusetts. The third recognized endemic area is in California, and includes the Sacramento and San Joaquin valleys, which occupy a large portion of the central part of the state. It is probable that the New England endemic area actually extends southward to the large southern area of which it is in reality a part.

As indicated by reports received from state and city health departments, and the records of army posts, there are lesser endemic areas scattered here and there in many other states (see map).

The records of the army posts are not without interest. Fort Washing-

ton, Maryland, had for several years up to 1913 the highest malaria sick-rate of any post in the United States. The admission rate varied from 736 per 1,000 mean strength in 1906 to 172 per 1,000 in 1912. In the annual report of the Surgeon General of the Army for the year 1911, in referring to the conditions at Fort Washington, it was stated that the malaria rate at this post was higher than that of any post in the Philippines garrisoned by white troops, except Camp Stotsenburg.

While the malaria rate in the army has steadily declined during recent years, it is suggested the cause is the improved conditions at the posts, better barracks and greater attention to screening and drainage, also that the troops still suffer from infection in localities surrounding many of the posts.

In 1914 the highest malaria rate at any army post in the United States was 73 per 1,000 mean strength at Washington Barracks in the District of Columbia. The second highest was at Fort Myer, Virginia, just outside of Washington, and the third highest at Leavenworth, Kansas.

Epidemic at Greenwich, Connecticut.

With reference to the endemic area in New England, Dr. Fritz Carleton Hyde* reported what he termed an epidemic of malaria occurring at Greenwich, Connecticut, in 1912. Malaria has been endemic in Greenwich and neighboring localities for many years. During the first eight months of 1913 two hundred cases of malaria were reported to the health department and a house to house canvass resulted in finding 400 persons who stated they had had malaria during the previous year. The disease was one of the common ailments encountered by physicians in their practice. The tertian type seemed to be the only form present as shown by blood examinations. The impression was that malaria had not been nearly so prevalent for many years and its prevalence was quickly lessened by the clearing up of mosquito breeding places. The disease, however, remains endemic in this and adjoining sections of New England.

Economic Importance.

In localities where malaria is endemic, large numbers of people are likely to become infected, sooner or later. Many become infected year after year, and in some the disease becomes chronic. Infected individuals have their efficiency impaired, as parents, as workmen, and as citizens. Infected workers lose more or less time because of the disease and are less satisfactory workmen. While it is true that in endemic localities adults frequently develop an immunity, this is done at the cost of infections endured during childhood and youth, when the effects are a serious handicap to proper physical development and education. A malarious population may therefore be expected to be physically and educationally subnormal according to the degree of prevalence of the disease.

*Hyde, Fritz Carleton, *Am. Journ. Tropical Diseases and Preventive Medicine*, Sept., 1914, p. 199.

The economic importance of the disease is well brought out by a report of von Ezdorf* on conditions at a mill town in an endemic area. The health officer of the town who had been employed by the mills to render medical services to the employees and their families stated that 75 per cent. of the people in the town had malaria during the summer of 1910, and that its prevalence during 1911, 1912, and 1913 was as great. As a result of the excessive prevalence of this disease, people were coming and going, so that it was estimated that 50 per cent. of the population were in a sense transients. Mills were operating shorthanded much of the time during these years. The medical services in attending the sick suffering from malarial fevers became quite arduous, so that during the four months of June, July, August, and September, 1913, visits on account of malaria alone averaged 50 per day. At times there were three, four, and even as many as seven members of a family suffering with malaria at the same time.

In October, 1913, a house to house canvass of four blocks was made, and of 500 persons, 233 reported having had chills and fever during the preceding five months. The blood of 400 persons was examined and the plasmodium found in 55 or over 13 per cent., approximately one in every seven examined.

Measures were inaugurated to get rid of mosquito breeding places and the use of quinine was encouraged. A year later the town was again visited and the blood of 780 persons examined. Of these only 35, or 4.5 per cent., showed infection. The health officer reported that his visits among the mill employees for several months had averaged not over one a day and that many of these were undoubtedly old infections lasting over from previous years. The malaria rate had continuously decreased during the months when it was usually at its worst. The health officer in his report for 1914 stated that while during the summer of 1913, prior to antimalarial work, the mills were constantly short of help on account of the large number of employees sick with malaria, during the summer of 1914 there had not been a day when the mills did not have sufficient help. The manager of one mill stated that the improvement in the regularity and efficiency of the employees had been such that the amount of $1,000, which the mill had contributed to the fund for antimosquito work, was more than regained in one month's operation. During the succeeding year very few cases of new infection were found, although a number of chronic infections persisted. In October, 1915, the examination of the blood of 968 persons showed only 3.5 per cent. infected, while the blood of 30 persons living in surrounding uncontrolled territory showed 6 infections. At this time the manager of one of the mills, previously mentioned, wrote:

"I will frankly admit that I could not realize what a great change could be brought about by systematic work and with comparatively little ex-

*von Ezdorf, R. H., Demonstrations of Malaria Control, *Public Health Reports*, March 10, 1916, pp. 614-629.

pense. The money spent in anti-malarial work here has paid the quickest and most enormous dividends I have ever seen from any investment, and after having had our experience I would, if necessary, do the work over again if I knew it would cost ten times the amount. . . . Our experience has taught us that the eradication of mosquitoes is not only the proper thing to do from a strictly health standpoint but it is an exceedingly profitable thing to do."

Conclusion.

In conclusion, the malaria situation in the United States may be summed up as follows:

(1) In the territory extending from the Gulf of Mexico to a line north of the Ohio River and from the Atlantic seaboard to and into the eastern part of Kansas, Oklahoma, and Texas, few, if any, localities are entirely free from the disease. In most of the lowlands it is very prevalent, in the mountains and better drained areas less prevalent.

(2) The disease is endemic in southeastern New York and parts of Connecticut, Rhode Island and Massachusetts, and in California in the Sacramento and San Joaquin valleys.

(3) Perhaps there is no state in the Union in which the disease is not present and in which it is not spread by mosquitoes grown locally.

(4) The disease constitutes one of the big national health problems. It is also an economic problem of importance.

(5) The actual geographic distribution of the disease and its relative prevalence can be definitely determined only by making painstaking malarial surveys or by requiring cases to be reported to the health authorities and the authenticity of the reports verified by blood examinations.

THE CLINICAL THERMOMETER AS A CARRIER OF INFECTION.

L. Martocci-Pisculli calls attention to the danger of conveying infection from one patient to another by means of the clinical thermometer. Many physicians content themselves with rinsing their thermometers in cold water and then using them on one patient after another. A number of thermometers were taken from various physicians in order to determine whether germs were actually carried in this way and whether they could be recovered and grown in culture media. Several dozen thermometers were examined by competent bacteriologists in the research laboratory of the New York City Department of Health. It was found that all thermometers taken from patients carry live pathogenic germs and are therefore disease carriers. Washing them in water and wiping them dry in no way destroys the germs or even reduces the danger of carrying infection. Cool water hardens and so fixes the mucus with the containing bacteria on the thermometers. It is absolutely imperative to disinfect the thermometer after using it on a patient. Physicians must either devise some method of disinfecting the thermometer while carrying it in its case, or spend a few minutes in each patient's house to disinfect it.—*Medical Record*, November 28.

THE NEW UNITED STATES LIFE TABLES, THEIR PURPOSE AND WHAT THEY SHOW.

JAMES W. GLOVER,
Professor of Mathematics and Insurance, University of Michigan, Ann Arbor, Michigan.

Read before the section on Vital Statistics, American Public Health Association, Cincinnati, Ohio, October 27, 1916.

SPECULATION on the chances of life and death has been indulged in by writers, artists, and philosophers of all ages. The dominant note characterizing these reflections, particularly in the mediæval arts, is that Death strikes at random, that there is no law in the aiming of his shaft. This belief* is borne out in the Dances of Death which picture the skeleton reaper leading alike the young and old, rich and poor, good man and gambler, in a wild dance to the grave. A fifteenth century painting of a Dance of Death is still preserved on the walls of the chapel of Marien Kirche at Lübeck. In the beginning of the sixteenth century Holbein produced fifty-three designs of the Danse Macabre which express the traditions of this period concerning death. They are pronounced by a high authority to be the first and perhaps greatest satirical moralities known to the modern world.

Death is pictured in various forms, all more or less hideous and fantastic. A famous fresco in the Campo Santo, Pisa, "The Triumph of Death," dating back to the middle of the fourteenth century, depicts Death as an old hag with bat-like wings about to descend upon a company of youths and maidens, who, in the enjoyment of music and love, are quite unaware of the grim presence. Throughout this painting, rich in subjects and details, the moral is to prepare for the unexpected coming of Death, by a life of meditation and good deeds rather than to indulge in the selfish pursuit of worldly pleasure.

The same thought runs through the greatest of the morality plays, Everyman, which is assigned to the latter half of the fifteenth century. When "Dethe" appears unexpectedly to Everyman—"O, Dethe, thou comest when I had thee leest in mynde!"—he is deserted by all his friends except "Good Dedes." Everyman, when advised by "Dethe" that he "must take a longe journey" implores in vain for respite—

> O wretched caytyfe, wheder shall I flee,
> That I myght scape this endles sorowe?
> Now, gentyll Deth, spare me tyll to morowe,
> That I may amende me
> With good advysement!
>
> DETHE
>
> Naye, therto I wyll not consent,
> Nor no man wyll I respyte;—
> But to the herte sodeynly I shall smyte
> Without ony advysement.

In more recent times music has contributed through Kastner a remarkable treatise on "Les Danses des

*Karl Pearson dwells on this theme in his essay on "The Chances of Death."

Morts" and Saint Saëns gave to the world the beautiful and mournful symphonic poem, the "Danse Macabre."

The English bills of mortality, which correspond to our death certificates, first appeared about 1538, but the age at death was not stated on these bills until as late as 1728. This would indicate that little importance was attached to the age at death and may be regarded as consistent with the notion that it was a random distribution with respect to age as well as social condition.

The idea of blind chance in the hand of Death probably persisted in the minds of the masses throughout the last century. This is reflected in the almost universal practice of guilds and societies of the working classes of collecting equal dues of all, without regard to age, for insurance protection or funeral benefit, in the event of death.

It was not until the end of the seventeenth century that Edmund Halley, the distinguished English astronomer and mathematician, prepared the first life table, and showed that the law of averages, not pure chance, governed the steps in the weird dance of death. This result was presented to the Royal Society in the form of a paper entitled "The Degrees of Mortality in Mankind," and published in the Philosophical Transactions in 1693. This table has since been known as the Breslau table; no English records being available at this time, it was based on the records of 6,193 births and 5,869 deaths in the city of Breslau in Silesia during the five years 1687 to 1691.

I have often wondered if Addison's Vision of Mirza, which appeared in the *Spectator* in 1711, eighteen years later, was not inspired by Halley's Breslau life table. This remarkable allegory presents a most striking picture of the march of human life, of the dance of death. Mirza, the prince, is led to the highest pinnacle of a rock near Bagdad by the genius, where the following colloquy takes place:

"Examine now," said he, "this sea that is thus bounded with darkness at both ends and tell me what thou discoverest in it."

"I see a bridge," said I, "standing in the midst of the tide."

"The bridge thou seest," said he, "is human life; consider it attentively."

Upon a more leisurely survey of it, I found that it consisted of three score and ten entire arches, with several broken arches, which added to those that were entire made up the number about an hundred. As I was counting the arches, the genius told me that this bridge consisted at first of a thousand arches; but that a great flood swept away the rest and left the bridge in the ruinous condition I now beheld it.

"But tell me further," said he, "what thou discoverest on it."

"I see multitudes of people passing over it," said I, "and a black cloud hanging on each end of it."

As I looked more attentively, I saw several of the passengers dropping through the bridge, into the great tide that flowed underneath it; and upon further examination, perceived there

were innumerable* trap-doors that lay concealed in the bridge, which the passengers no sooner trod upon, but they fell through them into the tide and immediately disappeared. These hidden pitfalls were set very thick at the entrance of the bridge, so that throngs of people no sooner broke through the cloud, but many of them fell into them. They grew thinner towards the middle, but multiplied and lay closer together towards the end of the arches that were entire.

There were indeed some persons, but their number was very small, that continued a kind of hobbling march on the broken arches, but fell through one after another, being quite tired and spent with so long a walk.

In the Vision of Mirza the delightful contributor to the *Spectator* has given us the first and most entertaining description of a life table. It is free from technicalities and unblemished by the presence of a single statistical fact. To convert it into a modern life table and make the transition as easy as possible, I will merely add that in this bridge of human life each span or arch represents a year, and the throng or multitude entering upon the bridge is usually taken as one hundred thousand. The life table then shows in cold figures the number of passengers who fall through the concealed trap-doors in each span or age interval, in other words, the number of survivors at each age out of 100,000 persons born alive. Upon this fundamental information is built up the entire structure of the modern life table.

This year the Bureau of the Census issued the first publication devoted exclusively to life tables; it appears under the title† "United States Life Tables: 1910," and contains twenty-five life tables prepared under the supervision of Professor James W. Glover, of the University of Michigan. Similar tables have been published from time to time in England, France, Germany, Sweden and other countries; in some cases these tables date back over a century and tables based on statistics collected during the period 1850 to 1900 are quite numerous.

The new United States life tables are based on the census enumeration of 1910 and the mortality statistics of 1909, 1910 and 1911, in the original registration states, consisting of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Indiana and Michigan, and the District of Columbia.

The first table is for both sexes in the original registration states; it is fairly representative of mortality conditions prevailing in this country because it is based on over twenty-four million enumerated lives and one million reported deaths. The next fourteen tables are for males and females, respectively, in the following classes in the original registration states: aggregate, white, negro, native white, foreign white, cities, and rural.

*Pearson, in "The Chances of Death" pictures the bridge of life and in place of the concealed trap-doors introduces five skeleton marksmen who shoot down the passengers in accordance with the distribution in five frequency curves whose resultant he conceives to represent approximately the law of human mortality.

†A copy may be obtained free by writing to the Director of the Census, Washington, D. C.

Finally, ten tables appear for male and female, respectively, in Indiana, Massachusetts, Michigan, New Jersey and New York.

The preparation of a life table from the census and mortality statistics is like striking a balance in a set of accounts. Only through the life table can one know at each age the mortality rate, expectation of life, and annual death-rate in the community. Crude rates may be quite misleading; for example, a pioneer community including an excess of young persons might show a lower annual death-rate than another community in which there is a preponderance of older people, and it might be inferred that the first group was enjoying a more favorable mortality rate. A life table based on the same data might show that in the first community the mortality rate was actually higher at every age than in the second.

The United States life tables are intended chiefly as a source of information for the public and to this end are presented in simple form, with detailed explanations and numerous examples illustrating their use. Apart from this general purpose they are expected to serve as a source of reference to public health officials, students of vital statistics, and physicians. Statisticians, actuaries, sociologists, economists, and writers on public health will find much useful material for consideration, discussion and interpretation.

Life tables are frequently used in legal practice in cases where the value of a life annuity is needed to fix the measure of damages; the value of the expectation of life is also required very often. They may also be employed in the valuation of reversions, retirement funds and old age pensions. The tables which have heretofore been employed have too often been based on statistics not applicable in this country. It is well known that the Northampton table based on English experience exhibits mortality rates altogether too high and annuity values correspondingly too low. Other tables employed have been based upon insurance experience involving selected lives. The present tables will in most legal cases be found better adapted to conditions in this country.

A detailed comparative study of mortality in different classes of the population is made possible through the life tables, and raises numerous important questions which deserve the most careful consideration. Among the larger questions a few may be mentioned here. The excess of city over rural mortality is so great that the attention of health officials should be given to this subject without delay to determine its cause and to what extent it is practicable to reduce city mortality to the minimum actually existing in the country. To give an idea of the difference, the tables show that out of 100,000 rural male births 58,117 survive to age 60 while among the same number of city births only 43,454 survive to this age. In other words 14,663 more men out of the same number of births, 100,000, would attain to age 60 in the country than in the city on the basis of existing mortality rates. These figures are so

astounding that they deserve the utmost prominence. Similar differences exist in England and Germany as shown by recent life tables. The tables show that the mortality rates among women are lower throughout the entire range of life than for men and that the expectation of life of women is much greater. While this is true in general there is a striking exception in the case of rural women. It appears from the tables that from ages 20 to 40 the mortality rate for rural women is almost as great as that of the men except from ages 25 to 31 where it is actually greater. The same thing occurs in the case of negro women from ages 10 to 20. It would be interesting to know what is the cause of these curious exceptions.

There is considerable interest at the present time in occupational mortality, particularly in the manufacturing industries. The life table for Massachusetts exhibits approximately occupational or industrial mortality as compared with that exhibited by a state like Indiana which is largely rural. The industrial mortality is greatly in excess of that in the rural communities.

The infant mortality tables contained in this publication offer an excellent opportunity for a comparative study of infant mortality in different classes of the population.

In all these studies the question naturally arises whether the differences exhibited in mortality rates are due to racial characteristics and not easily changed or whether they are due to environment and mode of living and admit of improvement.

Is it possible to attain approximately as favorable a mortality for all classes as the actual minimum now existing for rural men and women? The answer to this question is of more profound significance to the people of this country than any other now before it. I predict that the day is not far distant when the leaders in action in our national affairs will rise to a recognition of its importance.

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DEATHS BY FIREARMS IN THE UNITED STATES DURING 1915.

The Census figures bring out the astonishing fact that during the year 1915 firearms caused more deaths than railroad accidents, more than five times as many as street-car accidents, nearly as many as railroad and street-car accidents combined, and more than twice as many as automobile accidents. The total number of deaths due to the use of firearms in the registration area in 1915 was 7,994, corresponding to a rate of 11.9 per 100,000. Of these deaths, 3,608 were suicides, 2,885 were homicides, and 1,501 were accidental (including those concerning which the status as to suicide, homicide, or accident was in doubt). The suicidal use of firearms has increased from year to year since 1913; the frequency of accidental deaths due to their use shows a slight decline during recent years; and the homicidal use of firearms shows a decline as compared with 1913 and 1914 but an increase as compared with 1910, 1911, and 1912. No separate data as to homicides by firearms for the years prior to 1910 are available.

PATHOGENICITY AND LONGEVITY IN DIPHTHERIA BACILLI.

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THE work to be described has been done with the object of obtaining some facts which would give a satisfactory basis for answering some of the following questions.

(1) "Considering bacteria of the same species, have those which exhibit the greatest resistance to germicidal action a corresponding increase of pathogenic power over their fellows which succumbed?"

(2) "Or, are the few which survive exposure to detrimental conditions for long periods practically innocuous?"

These questions have frequently been answered by the theorist, but satisfactory experimental work for which reliable conclusions can be deduced has not in our knowledge been done.

An endeavour has been made to throw some light on the relationship existing between pathogenic powers and anti-bactericidal power of certain micro-organisms. The question is of interest and of importance from a public health standpoint.

It is known that when large numbers of bacteria are uniformly exposed to the action of a bactericide, that some show greater powers of resistance than others and will survive for a greater or less period of time.

The few which survive this trying ordeal have been referred to as "huskies," intimating that unusual power of resistance was associated with unusual physical vigor.

Have the surviving minority pathogenic powers as potent as the members of the same strain that were weaker and thus destroyed? Or, do the increased powers of resistance exist at the expense of pathogenic qualities? Or, lastly, is increased resistance the concomitant of increased infectivity? The work here reported if not definitely answering such questions will, at least, bring before us some interesting facts along these lines.

Before giving details of each experiment a general outline of the work had better be given.

The only organism worked with at present has been the diphtheria bacillus, for the reason that fairly accurate virulence tests can be made with comparative ease.

The first procedure was to obtain a pure culture of B. Diphtheria, from a clinical case. Isolation was not difficult by making tube dilutions on Loeffler blood serum and fishing from the most suitable.

The culture used in the experiment was almost always the first culture on blood serum from colony fished.

From the culture special broth was inoculated, and incubated at 37°C. for twenty-four hours. For this work

the broth was put up in large quantities in test tubes, each containing 10c. The same batch of broth was used from beginning to end of experiments.

Formula for Bouillon:

Infusion of Veal	1000 grms.
Peptone	20 grms.
Sodium Chloride	5 grms.

Method of preparation is the same as for ordinary nutrient boullion. Reaction is made alkaline to litmus, after the media is made neutral to this indicator 7c.c. of a 10 per cent. Sodium Hy. Soln. is added.

After twenty-four hours' growth, the culture was well shaken and a definite quantity injected into a guinea-pig, the quantity varying with the weight of the pig. The animal was now watched and time between injection and death recorded. Cultures were then made from the site of injection and internal organs.

From the same culture used to inoculate the broth, several snugly wrapped cotton batting swabs were freely inoculated and replaced in their respective sterile test tubes.

Some of them were placed in the sunlight and others in the dark.

The swabs exposed to the sunlight were placed on a table in the middle of a conservatory, the roof and three sides of which were made of heavy wrinkled glass. The room was an exceptionally light one.

Swabs placed in dark. They were placed in the dark corner of a cupboard. The light was not entirely excluded as the cupboard had a glass front. But it compared favorably with a dark corner in a living or bedroom. At different intervals Loeffler's blood serum tubes were inoculated and incubated to ascertain whether there were still organisms capable of growth remaining on the swab. Early cultures made from such swabs would naturally give a very heavy growth, within twenty-four hours. But after longer exposure, such cultures would give but a very scanty growth of a few colonies which could not be seen till after twenty-four to forty-eight hours' incubation. This delay in growth was not recognised at first, so that if in twenty-four hours no growth could be seen, the blood serum tubes were re-incubated with their respective swabs. After eighteen hours' further incubation a luxuriant growth was generally present. This lead to the erroneous idea that probably only a few organisms had been left on the swab, these during the first incubation had produced one or two microscopic colonies which the second inoculation had spread and the later incubation increased. No estimate of the original number of colonies could be obtained when second attempts at inoculation were made on the same tube. This knowledge was not gained till the first experiment had been made so the organisms used in the second animal inoculation of this experiment were not as ideal "huskies" as they might have been.

Frequently when no growth can be detected with twenty-four hours' incubation, a further period of twenty-four hours will reveal the growth of numerous colonies.

This tardiness of growth even when

optimum conditions of artificial growth are offered is interesting, possibly giving us some idea of what may happen in natural infection with similarly attenuated organisms.

Should such weakened organisms reach the naso-pharyngeal mucosa, factors whose influence are but vaguely known come into play so that one can but surmise as to the final outcome. Conditions making infection favorable or otherwise undoubtedly will vary in individuals and in the same individual from day to day.

One must remember to discard a swab that has been twice used to inoculate a serum tube, as fresh inoculation of the swab would occur from any bacterial growth resulting from the first twenty-four hours' incubation.

It may also be mentioned, that pure cultures must be used on the swabs. The reason being that such organisms as S. aureus contaminating the swabs will outgrow the diphtheria bacilli during the first twenty-four hours and thus make isolation of the latter impossible. Its recognized faculty of rapid growth is lost when much attenuated.

The following experiment is given in detail to illustrate the method employed in the eleven experiments summarized below.

Experiment 1.

The organism used in this experiment was obtained from a swab sent to the laboratory, suspected diphtheria.

July 19—Obtained by tube dilution on Loeffler blood serum in pure culture. Morphology, granular bacillus, irregular in shape. Special broth was inoculated from the culture and incubated for twenty-four hours at 37°C. An endeavor was made to make as uniform in quantity as possible that amount of culture added to the broth in each case by the use of the same platinum loop.

July 20—Broth shows granular turbidity with no pellicle, stains show pure Klebs Loeffler Bacilli granular; shaken thoroughly; three pigs were injected with following amounts, .15 c.c., .25 c.c. and .35 c.c. The two receiving the last mentioned dose died in forty-eight hours, the former receiving .15 c.c. died in four days (wt. = 360 grms.).

July 20, p. m.—At site of injection the K. L. B. was recovered, solid forms were the commonest. Blood was negative, supravenal gland was somewhat congested but cultures were negative.

July 19—Good firm cotton batting swabs were inoculated from the pure culture, and placed carefully in test tubes so that their surfaces did not contact, and thereby exclude light. The same were now placed some in the sunlight and others in the semi-darkness.

Swabs placed in light—On a table in the middle of a conservatory, the roof and three sides of which were made of heavy wrinkled glass, the room was an exceedingly light one.

Swabs placed in dark—These were put in the dark corner of a cupboard. The light was not entirely excluded from them as the cupboard had a glass front, but it would compare well with a dark corner in a living or bedroom.

July 26.—Swabs were removed from these places and in blood serum inoculated.

July 27. *Swabs from light*—All showed growth but colonies were small and not numerous, had a dry appearance.

Stain—Loeffler's Methylene Blue, slender and granular, morphology variable.

Ten c.c. of the original special bouillon was inoculated with a loop smeared from this culture, and incubated for twenty-four hours at 37°C. At the end of this time the tube had a coarse turbidity. Purity tests were made and proved satisfactory.

Aug. 12—A guinea-pig (wt. 550 grms.), was given a subcutaneous injection of 3 c.c.

Aug. 13—Sick, died during night.

Aug. 13, p. m.—The organism was recovered in pure culture, from site of injection which

showed considerable inflammation and exudation The conclusion to be drawn from this case seems very evident, *i. e.*, that the progeny of the surviving organisms were equal in pathogenic power, with their deceased progenitors.

Aug. 23—Swabs from dark cultured on blood serum.

Aug. 24—No visible growth so the swabs were rubbed over the surface of their respective tubes and re-incubated.

Aug. 25—No growth on one tube, the other showed well marked and characteristic growth.

Aug. 26—From the culture bouillon was inoculated, after twenty-four hours' incubation marked turbidity was observed.

Aug. 27, 4 p. m.—2 c.c. was injected subcutaneously into a guinea-pig (wt. 350 grms.).

Aug. 28—Pig ill. Died during the night, about thirty-six hours.

Aug. 28, p. m.—Site of injection showed acute inflamation, cultures gave good growth of K. L. B. Blood cultures negative.

The following table gives a summary of the results obtained in eleven such experiments:

SUMMARY IN DIPHTHERIA RESEARCH.

No.	Morphology and staining. Time of isolation.	Pathogenicity. Time of isolation.	Pathogenicity. After desiccation (light).	No. days survived light.	No. days survived dark.	Final morphology and staining.
1	Irregular. Barred and metachromatic.	.3c.c.–360 grms. 48 hrs. .15c.c.–360 grms. 96 hrs.	.3c.c.–550 grms. 40 hrs. (21)	21		Irregular. Granular and barred.
2	Irregular. Barred and metachromatic.	.25c.c.–360 grms. 48 hrs. .15c.c.–360 grms. 96 hrs.	.2c.c.–360 grms. 36 hrs. (36)		36	
3	Solid and ghost enders.	.2c.c.–280 grms. 50 hrs.	.2c.c.–280 grms. 45 hrs. (40)	27	40	Barred and ghost enders. No solid.
4	Solid and double enders.	.3c.c.–350 grms. 120 hrs.	.3c.c.–350 grms. 120 hrs. (35)		35	Solid.
5	Slender, metachromatic.	.15c.c.–370 grms. 60 hrs.	.1c.c.–280 grms. 80 hrs. (55)		55	Solid, metachromatic.
6	Hoze enders and ghost enders.	.2c.c.–330 grms. 12 days.	.25c.c.–370 grms. 8 days (30)	30		Hoze enders.
7	Hoze enders and ghost enders.	.2c.c.–330 grms. 12 days.	.2c.c.–340 grms. 8.5 days (46)		46	Ghost enders.
8	Ghost enders.	.2c.c.–230 grms. 48 hrs.	.2c.c.–255 grms. 72 hrs. (40)	27	40	Granular, solid.
9	Mostly granular, some barred.	.2c.c.–280 grms. 40 hrs.	.2c.c.–500 grms. 48 hrs. (60)		60	Large granular bacilli.
10	Ghost enders.	2c.c.–400 grms. 40 hrs.	.2c.c.–520 grms. 50 hrs. (60)		60	Chiefly solid, type A and A1.
11	Small solid, not typical.	.2c.c.–450 grms. not pathogenic	.2c.c.–400 grms. not pathogenic (52)		52	Solid, hoze enders.

Note: Columns two and three (Pathogenicity, time of isolation and after desiccation) record the quantity of broth culture injected, the weight in grammes of the guinea pig infected, and the time in hours that the animal survived the injection.

The small figures in parentheses refer to the age of swab used in making the culture.

◆

During 1915, in Budapest, a city of 1,000,030 inhabitants, there were 21,162 deaths and only 17,825 births. Deaths from tuberculosis reached the exceedingly high rate of 35 per 10,000 population. A typhoid fever death-rate of 65 per 100,000 is reported. One hundred and seventy-five children died out of every 1,000 born.

REFUSE AND GARBAGE DISPOSAL—A GENERAL SURVEY.

LOUIS L. TRIBUS,
Consulting Engineer. New York City.

FOREWORD.

SMALL municipalities are wont to consider the collection and disposal of household, street and nuisance producing light manufacturing wastes, as an evil to be endured, and with a "hold your nose" attitude—gather the material in a more or less desultory and unsanitary manner and get rid of it in some way or other, without regard to efficiency or economy.

Large communities usually have more attractive or more popular projects that take public attention, so act towards this essential municipal function, with rather less consideration than even that given elsewhere.

When the quantities are large enough, longer visioned corporations are permitted to reap a harvest from the money making part of the problem, while the city burdens itself with abnormal and too often unnoticed expense for collection and delivery.

There is but one real side to the subject, *i. e.*—good business, though the one usually overlooked. It may be divided into two main characteristics; viz., Sanitary and Financial; with further sub-divisions as the problems are studied.

SANITARY.

(a) nature and care of receptacles.
(b) frequency and method of collection.
(c) treatment of collections to destroy disease and nuisance producing elements.
(d) disposal of resultant products in healthful manner.

FINANCIAL AND OPERATIVE.

(e) ownership of receptacles.
(f) municipal or private collection.
(g) lengths of hauling routes.
(h) treatment plants.
(i) management.

Many of these factors bear upon each other in such fashion that choice of some particular method may cause change in others. It is just because of such effects, that the subject for any given place, must be studied with unbiased mind after securing comprehensive knowledge of conditions.

The agent of a special furnace or process, or some particular kind of collection device can not dissociate himself sufficiently from it, to give the most intelligent study to and trustworthy advice upon the main question.

Consequently, those must be looked to for opinion, who to good judgment and common sense, have added careful investigation and actual practice.

The physician—"health officer" will recognize the evils due to unsanitary methods and the advantages accruing from a well solved problem; the city engineer accustomed to a nice balance of cut and fill in his street grades and economical disposition of materials for strength and permanence

in his plans, with an eye even to the esthetic and artistic, does not usually have the actual experience necessary to wise decision in waste disposal cases.

The city manager, with his charts and diagrams, and arrangement of working forces, and willingness to take expert advice on technical matters is rather closer to the heart of the subject, for, if worthy of his position, he is constantly studying to maintain a right balance between the different parts of his work, scientific, practical and financial.

It may safely be stated that neither in the United States or abroad have the problems been solved completely in all their features in any one given city.

Some have reached economy, convenience and sanitary success in one or more characteristics, but have failed in others. At first thought one might say, why not take the different features that have been successful in various places and combine them into a complete success for some particular city.

That is just what numberless cities have attempted to do, following the reports of various officials upon their junketing trips of investigation and the accumulation of reports, suggestions, plans, proposals, etc., from all kinds of sources.

Then the ruling bodies, by that time well saturated with information (biological and financial hash), decide on a scheme, and one more economic crime is launched.

Often sincere are the men who thus act, and none should decry their gathering of information and attempting to fit themselves for decision and action.

It is impossible however, for officials, having other regular duties of importance, to give such time and attention as shall enable the preparation of the basic plan in so intelligent a manner as to produce final results of efficiency and economy.

Frequently appears the item that Jonestown, Smithlake, Brownsbury or some other well known place, has entered into contract for a garbage incinerator, or a reduction plant, with glory to the officials in charge and profit to the sales agent, but in the unfortunate ignorance of the taxpayers, with continuing annual waste of their money.

Not necessarily waste, so far as the plant's operations go, but waste due to a lack of harmony between collection and disposal.

A few are studying the combined problems and may give good account in results, but until the public is educated up to its own interests, so long will failures continue to develop,though they are not often made public by the unfortunate community, which frequently is ignorant even of the actual fact of failure.

Sanitary.

(a) *Nature and care of receptacles.*

Decrepit coal scuttles, wooden soap boxes, battered and leaky wash boilers, newspapers, galvanized iron pails, cans with or without covers, and waterproofed tough paper bags, all are found in service.

The generally accepted receptacle for garbage is the heavy galvanized

pail with close fitting cover, but in some few places, the paper bag is added as the lining or actual container.

If used with care it is an excellent one, but its field is practically limited to garbage, for hot ashes would create trouble and their roughness and weight would exceed the strength capacity of the paper.

Galvanized iron cans holding about 100 pounds are standard for ashes, while general rubbish receptacles can not be standardized.

Too little attention is paid by many householders to the cleanliness of the receptacles, and to their being kept tightly covered. They should be frequently washed and scoured so that no putrifying old matter can remain to inoculate the new, and in warm weather be sterilized with strong disinfectants. Any less care will insure the breeding of flies with all their nuisance and danger to health, as well as the development of offensive odors.

(b) *Frequency and method of collection.*

Daily, *i. e.*, six times a week is wise, if population is congested, and is essential to decency, if hog feeding with the garbage follows; many places collect but three times, and a few only once weekly.

If mixed materials are gathered, the longer intervals may pass, from a sanitary viewpoint, so that quantity then determines frequency, because ashes and paper etc., absorb much of the moisture from the garbage to some extent therefore deferring putrefaction.

The one-horse farm box wagon can be often found doing service and the one-horse contractors' wooden dump cart, but more usually in the larger cities steel bodied water tight dump carts, with or without tarpaulin covers, to presumably hide the unpleasant contents and as some fondly hope, to prevent the escape of odors and dust.

Two-horse four-wheeled bottom dump wagons have been tried somewhat, where the length of haul is considerable, and a few experiments have been made with motor trucks to be loaded with the cans or boxes.

In at least one well known American city two-horse collecting wagons are in service, provided with removable steel bodies, which at an unloading station are removed and stacked on railroad flat cars, for transporting several miles to the treatment works. In some of our other large cities carts collect the garbage and dump it at central stations, into steel hopper cars, hauled daily to the works, or upon barges for water disposal or distant place treatment.

None can say that either of these methods is the best; local conditions and attending circumstances can alone determine, but in general, the shorter the haul between the house or shop and the place of treatment, with the least intermediate handling, the greater will be the efficiency in operation and the lower will be the cost.

(c) *Treatment of collections, to destroy disease and nuisance producing elements.*

From time immemorial, household and municipal wastes have found final deposit in vacant lots and low lying ground, where exposed to sun and rain, partially burned, or covered with ashes or earth and sometimes sprinkled with disinfectants they have gradually

found their way back to their original elements creating nuisance or not in the process, as lack of care made possible or esthetic taste decided.

On a farm, hogs consume the vegetable and animal household wastes, usually in a fresh condition, hence a perfectly unobjectionable process. In a small town with sufficiently frequent collection, the same method is followed without particular detriment, though some of the material could scarcely be thought to be in very choice condition; even for hog food.

For large places, though actually in vogue in several, the practice is condemned by the most progressive sanitarians.

The nature of a population has also much to do with the suitability of method. With rigid and careful separation of garbage, ashes and dry refuse, where quantities are large in the aggregate, it may be wise to treat the garbage for recovery of its grease, ammonia and tankage. The ashes can usually be used for filling, or even be separated to recover their fair residue of good coal; while the other materials can be assorted for sale and the worthless remainders be burned. Corrosive disinfectants, like quick lime, are occasionally used as a temporary treatment, but practically never outside of the tropics and military camps as a general means for destruction.

Treatment by fire is very effective, absolutely sanitary, and successful if conducted intelligently.

Briefly summarized therefore final disposition can be classed as animal, earth, chemical and fire; each with its own peculiarities, limitations and possible secondary problems.

(d) *Disposal of resultant products in healthful manner.*

From a reduction plant the waste liquors can safely pass in the sewer, without nuisance en route or involving large difficulty in operating sewage disposal works. The grease is extracted, barreled and transported as an inoffensive manufactured commodity; animal hides are salted or crudely tanned and baled for ready handling; tankage is dry, fairly odorless, can be packed in bags and usually be removed in car load lots.

As a general rule such plants are located near a railroad.

From incineration works, nothing of offensive nature exists as a product; power is developed for local use and the slag, bricks, blocks etc., are transported as are other building materials, without offence.

Financial.

No municipal operation can be considered, no matter how important even from public health standpoint without weighing its financial factors. Here is where so many places completely fail, because most attention is given to that which seems to chiefly interest the public at the time; sentimental objection too often outweighing good business sense.

(e) *Ownership of receptacles.*

Almost universally, receptacles are the private property of the householder, being carried full to the collect-

ing cart and returned empty and foul, to again be filled.

In view of the unsanitary condition that usually so wholly prevails, due to neglect in caring for the emptied receptacles, the plan has been tried, though not on large scale, of removing the refuse in its receptacle and leaving a clean sterilized can in its place. Naturally this tends to municipal ownership of the can, and as a matter of full community economy, such is wise, for, bought in large quantity, the lowest prices can be secured, and under the right kind of supervision, better care would be accorded by the collectors, than they usually give to privately owned receptacles. In the long run therefore this means lower net cost to the taxpayer.

With municipal ownership there should go municipal cleansing.

(f) *Municipal or private collection.*

Unsightliness and uncleanliness have universally gone hand in hand with private collection. If the contracts be made with the individual property owner, extortion and petty graft accompany them; if made with the community, on basis of doing the work for the least sum per year, inattention and skimping the service follow, with more petty graft; if on basis of yardage or tonnage hauled and delivered, every incentive to pad the figures, and to take material not properly collectible.

It is a moot question just what wastes should be publicly removed, and what should be considered "trade" with the cost of removal, included as a factor in the value of the manufactured article similarly to that of gathering the raw materials.

If general private collection be in vogue, this last problem is of but small import, but if full municipal operation is in effect, particularly in a large city, the item becomes of importance.

The public removal of wastes has grown up from the sanitary side, to free the householder and the small tradesman from the nuisance and expense of removing small quantities of putrescible matters and those having no further household or store use; into one having universal community importance. It has been further adopted as a means of greater net civic economy as well as of health.

With the very rapid growth of the large apartment houses and hotels and development of the department stores, the questions may well be raised; are not the wastes technically of "trade" nature, and therefore should they not be removed at private expense.

Some cities solve the problem by limiting the quantity for daily removal from any one place, more nearly equalizing the expense therefor, but some injustice is inevitable.

Probably the only measure of strict justice would be to require payment of small fixed sums for each can or barrel or cartload of refuse removed, using a ticket system to prevent crookedness of collectors; this is in effect in a few places.

With municipal management the collecting cart, wagon or truck can be more readily standardized and greater cleanliness be controlled. Greater initial expense may prevail, though tak-

ing all factors into consideration, the community will be better off in the long run and certainly is likely to be better served and satisfied.

(g) *Lengths of hauling routes.*

This is a subject solely of local import; no direct comparison between different places can be made to advantage, unless their topographical, geographical and development conditions are identical, which of course is rarely the case.

The ideal is to have the collecting routes start at the higher levels, and proceed downhill to the treatment or disposal centres, with the minimum traction distance for the filled vehicles after leaving the last collection point. The nature of occupancy of the district will determine the quantity of material, therefore the length of haul for each vehicle during loading. Other conditions will somewhat determine the place of treatment or disposal, therefore the total lengths of haul. These conditions fix the daily service of each vehicle, consequently the cost of collection; obviously therefore, if the places of treatment can be at the centres of the producing districts, so arranged that there is the minimum of dead traction, there will follow the maximum collecting efficiency and the minimum of collection cost.

(h) *Treatment plants.*

Each city presents its own characteristics, dependent on geographical location, as to latitude; on topographical position, seashore, river front or inland; and on type of occupancy, residential, business or manufacturing.

There are seasonal variations, not only as to quantity of garbage, ashes and rubbish, but as to their qualities as well. All these factors have bearing on suitable method of treatment and of course the net cost of operation.

There are two practices in plant development which depend largely on contract conditions. If the municipality is to handle its own wastes there is little excuse for the niggardly, which usually means ultimate wastefulness. If a private corporation is concerned the time of contract becomes a controlling factor. With a short term of years, say five to ten with uncertainty as to renewal it would not pay to erect permanent structures, or go to refinements in machinery with the possibility of scrapping the whole, or selling out at a figure so low as to be an almost negligible return.

For this reason discredit has been cast on so many existing systems, and the idea prevails that such conditions must necessarily be unchangeable.

Three main types of plant have been popular or rather have been endured.

The earlier form, burning the garbage and refuse at temperatures under 900 degrees, with almost inevitable escape of noxious gases, smoke and dust. The next, cooking the garbage and extracting its elements of value, usually though not necessarily creating local nuisance, and the third, incineration at high temperature (1,400 to 2,000 degrees Fahr.).

The first mentioned is scarcely considered any longer as a method worthy of adoption.

Under the second it is quite possible

to take raw garbage even in a more or less putrid condition and treat it with live steam in closely sealed receptacles and pass the by-products and residues through stage after stage in practically closed processes, with induced draft ventilation and fire consumption of gases, so that even within the buildings themselves there will be little offense, and outside, practically none at all from the process itself. Unfortunately however most plants are not conducted along such lines.

The third and more recent form is the high temperature incinerator where all classes of collections are burned, without the use of extra fuel and if properly designed and suitably operated, without causing local nuisance of odor, smoke or dust. Such a plant will secure from the fuel value in the ashes and the rubbish, heat sufficient to operate itself and leave a considerable surplus for other purposes. This has been used to operate sewage and water pumping stations, to furnish electric lights and several kinds of small manufacturing.

One of its most valuable properties is the feasibility of erection within the district of collection, practically eliminating excessive haul.

The reduction method has heretofore appealed most to private capital, for a very complete sale of by-products could usually be effected, but as municipalities take over the care of more of their own utilities, the difficulty of making sales to advantage, with the possibility of local utilization of incinerator results, is tending to cause quite extensive consideration of that method.

Using several systems in the same place is not entirely out of question. The value of the daily wastes to an individual household is slight; the combined collections, aggregate such quantities of many different classes as to be well worthy of recovery and treatment to insure first, sanitary safety, and second, sale for remanufacture.

If the municipality handles the case itself in the most economical manner, all factors considered, there should be a sales or utilization value in by-products from both reduction and high temperature plants to pay for running them and yield some surplus towards the costs of collection.

Obviously collection must represent expense; interest on capital invested, depreciation, wear, and labor.

Grease and tankage have market values of but slight fluctuation; at lowest, they should be more than enough to meet expenses of well regulated works and help towards those of haul.

In incineration plants, steam becomes an available by-product which can be converted into electricity or be used direct for power to pump water or sewage as well as run the works themselves; the slag, in crude shape makes an excellent light filling for swampy lands, or if ground into various sizes, can be used in lieu of stone, gravel, or ashes in concrete for foundation or mass-wall work; if ground quite fine, with addition of cement it makes a fair brick or block for walls not exposed to the weather or to abrasion.

Of course having passed through temperatures of 1,400 to 2,000 degrees Fahr. all noxious matters are completely destroyed.

If proper credit be given to the value of these products, quite a respectable margin above expense will be shown, and a fair balance towards the cost of collection, as in the case of reduction works. Let no one imagine, however, that the combined work of collection and disposal will yield a net profit to the community in any present day system.

In reduction works where the processes have been carried out in the best manner, the dry and ground garbage tankage from which the grease has been extracted makes a fair basic material for land fertilizers, but needs first the addition of other ingredients. The different agricultural companies will however buy it at prices making it worth treatment. The grease chiefly goes to soap companies who are constantly looking for new sources of supply.

Incineration plants do not have quite so wide a field for sale of by-products, but if they are utilized direct, or worked up for other municipal department uses the net return is quite material.

(i) *Management.*

A lack of understanding upon the part of city officials in general has led to such a condition of affairs that they have hesitated to undertake complete municipal management, fearing the criticism following nuisance in operation; also perhaps for less worthy motives, yielding to the importunities of those willing to face the contumely, provided they could secure the undoubted profits in running a disposal plant, while the community stood the expensive features of collecting and delivering the materials for treatment.

The reduction of garbage, so as to produce grease and fertilizer base as the chief elements, offers to corporations the most likely field for operation, so that this has probably accounted in large measure, for the existence of so many reduction plants in the larger cities.

In the past there has been opportunity in most places for the ready deposition of ashes and the burning of light rubbish without creating any large degree of annoyance. Again there is in the collections, much material of real value which will warrant the sale of picking privileges. The municipality itself will not often bother with details, but is usually perfectly willing to unload the responsibility upon a contracting firm and allow it to make what profit there is, and give the semblance of thoughtfulness for the taxpayers by selling the privileges to the highest bidder, with rarely any return of equivalent value.

Unfortunately the output of power in incineration plants is not usually constant, so that unless used to supplement other municipal needs, it can not be sold on terms sufficient to make it a paying enterprise, consequently private corporations are averse to adopting the method.

The foregoing review of refuse handling is suggestive rather than exhaustive, even as to number of topics considered. Full articles could with profit be presented on each of the factors. For general discussion the main points of sanitary efficiency, financial economy and taxpayers' convenience may be emphasized, while the many technical matters may be left to each place to study for itself.

STANDARD METHODS OF BACTERIOLOGICAL ANALYSIS OF MILK.

PROVISIONAL REPORT OF THE LABORATORY SECTION OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.*

Presented before the Laboratory Section, American Public Health Association, Cincinnati, Ohio, October 24, 1916.

SINCE the publication of the earlier Standards in 1910 the demand for this kind of work has grown rapidly. Especially has this been true of the last two years under the stimulus of the demand for the grading of milk. It has become apparent that a bacteriological analysis of milk is required for two very distinct purposes, which of necessity demand different methods.

1. Routine Milk Analysis.—This type of analysis is designed for the general control of the public milk supply and for the purpose of grading of milk. For routine analysis the work must be capable of being done quickly and cheaply, and in such a way as to give the most speedy results possible and by methods having the smallest possible expenditure of time and money, consistent with fair uniformity of result. The demand for rapid methods, with the smallest possible expenditure of time and money, has been forced upon different laboratories in the last few years, and has brought about various short cuts from the standard methods as previously formulated. The necessity for such rapid and inexpensive methods must be recognized. But it is also evident that they should be made uniform in different laboratories.

2. Research Methods.—That the routine methods as adopted by public laboratories are inadequate to give the kind of results required for research work has also become evident. To use the Standard Methods as adopted for control work will not give a sufficient grade of accuracy for scientific investigation.

In the former publication of Standard Methods these two different purposes were not recognized, since the bacteriological control of the public milk supply had hardly started and no one could anticipate what it might demand.

ROUTINE METHODS OF ANALYSIS.

Collection of Samples.—All collecting apparatus, glassware, pipettes, collecting tubes, bottles, etc., shall be sterilized at a temperature of at least 175° C. for one hour.

Each sample shall consist of at least 10 cc. of milk. Before taking the sample the milk shall be mixed as thoroughly as possible. If the original container can be inverted the mixing of the milk should be done by inverting it several times. If this is impossible, the milk should be stirred with some

*The Committee would welcome suggestions and criticisms from members of the Association during the coming year.

sterile stirrer. Any stirrer already in the container may be used. If there is none in the container, the sampling pipette (or any other sterile article) may be used; but it should be used for one container only until it is again sterilized.

A sample simply poured from a large can is not a fair sample unless the milk in the can be thoroughly stirred. The sample shall be taken from cans by means of a tube with straight sides, long enough to reach the bottom of the original container, and inserted, not too rapidly, with the top of the tube left open. This will result in the tubes containing a cylindrical section of the milk from top to bottom of the can. The finger then placed on top of the tube will make it possible to withdraw the tube full of milk and transfer it to the sampling bottle. The sampling bottle should be large enough to hold the entire contents of the tube, *all of which* must be reserved as the sample. Each tube shall be used for collecting a single sample only, and must be washed and sterilized before it is used again. An aluminum tube of the diameter of ¾ inch and 21 inches long is very convenient. If the sample is to be taken from a bottle, the bottle should be first shaken to ensure thorough mixing and then the milk may be poured into the sample bottle, although it is better here also to use a sampling tube.

If the temperature of the milk is desired, it should be taken from a separate sample that should then be discarded. All records shall be made immediately after taking the sample. The milk sample shall be placed in a properly labelled bottle. The most convenient kind of sample bottles are glass-stoppered, or those closed with a cork-lined screw cap. Cotton plugs are not a satisfactory method of closure. The sample bottles shall be placed at once in a carrying case containing cracked ice, so that the milk is cooled at once to near the freezing point.

The samples shall be transferred to the laboratory as quickly as possible, and shall be plated at once. If the samples can be placed in melting ice and water they may be kept for several hours (12) without an increase in bacteria. If the plates are not made within four hours of the time of collection, the number of hours that have elapsed should be stated on the report. If the milk is kept at 40° F., a slight increase may be found in twelve to twenty hours. Up to twenty hours this will not be more than 20 per cent.

Media.*

Standard beef extract agar shall be used for all routine work. This shall be prepared as follows:

To 1,000 cc. of water add 5 grams of peptone and 3 grams of beef extract. The peptone shall be the best available, and the beef extract shall be Liebig's where this is obtainable. Weigh the containing dish and its contents.

Dissolve the peptone and beef extract by boiling and replace the water lost through evaporation.

* The medium here described is essentially identical with that used as a standard in water bacteriology. The slight differences in method of making make so little difference in the result that the two may be used interchangeably.

While still hot filter through filter paper.

Add 12 grams of oven dried agar, or 15 grams of market agar, and dissolve by boiling, or in an autoclav. Restore the weight lost by evaporation. It is imperative that the agar be of the best quality and *clean*, or it is impossible to obtain a clear medium. (When an autoclav is at hand the following modification is convenient. Add the peptone and beef extract to about 300 cc. of water, and the agar to 700 cc. Heat both in an autoclav under 15 lbs. pressure one-fourth hour. Filter the broth while hot through filter paper, and then mix the broth with the melted agar and filter through absorbent cotton.)

Determine the acidity of the medium by titrating 5 cc., diluted with 45 cc. water, with $^1/_{20}$ normal NaOH, phenolphthalein being used as an indicator. Any attempt to adjust the acidity is likely to make undesirable changes in the medium. Inasmuch as variations between +.5 and +1. acid make no appreciable difference in the results, the reaction of the medium is not to be changed if it falls between +.5 and +1. acid. It will usually be between these limits. If it should be above +1. acid, add enough normal NaOH to bring it to +1., and if it is below +.5 acid add enough normal HCl to bring it to +.5, always adding the smallest amount of the reagent possible to bring the reaction within these limits.

Cool to 45° C. and then heat to boiling (15 minutes) and filter through filter paper or absorbent cotton. It is necessary that the filtering be continued till the medium is clear. If the procedure here given is followed and a high grade of agar and other materials is used, there will be no difficulty in getting the agar clear. Egg should not be used as a clarifier.

After filtering the agar may be either tubed, 10 cc. in each tube, or placed in flasks containing about 150 cc. each. The latter method requires less glassware and less time, and is found to be equally satisfactory for plating as explained below.

Sterilize in an autoclav at 15 lbs. pressure (never above) for one-half hour, after dry steam comes from the autoclav. As an alternative the medium may be sterilized on three successive days in streaming steam, in which it must remain 20 minutes each day after the agar has completely melted.

If the flasks are to be kept for more than a couple of days, or are to be shipped, before using, cover the mouth of the flasks before sterilizing with paper fastened by a rubber band or by tinfoil, to retard evaporation.

Plating.

Dilutions.—For miscellaneous milk samples the character of which is not known, three dilutions shall be made: 1–100, 1–1,000, and 1–10,000. Where the character of the milk is known, the number of dilutions may be reduced. If the milk is pasteurized, certified, or known to be fresh and of high grade, the 10,000 and the 1,000 dilutions may be omitted; if the milk is known to be old and of high bacterial content, the 100 dilution may be omitted. In no case shall less than two plates be made of each sample.

Any convenient method of making dilutions may be used, always using pipettes and sterile water blanks. The water used for dilutions may be placed in dilution bottles (99 cc. and 9 cc. are convenient sizes) and sterilized for one hour in an autoclav at 15 lbs. pressure. These should be marked so that it can be determined that they have neither gained or lost water during or subsequent to sterilization. Or the water may be sterilized in bulk, if kept in a properly guarded container, and subsequently measured directly into dilution bottles with sterilized pipettes.

The dilution bottles should have glass stoppers or some other type of closing that makes shaking possible. Cotton plugs are unsatisfactory because the dilution water will soak into the cotton.

Straight-sided pipettes graduated to deliver between two marks are best, but pipettes marked to deliver may be used if care is taken that the points are not broken, and the tube is completely emptied.

In making dilutions the original sample and each dilution bottle shall be shaken 25 times, each shake being an up and down motion with an excursion of about one foot. After the final dilution fill a pipette to the mark and allow the contents to run into an empty Petri dish, the end of the pipette touching the bottom of the dish as the liquid runs out. If the pipette is one that delivers 1 cc., be sure that the last drop is carried into the Petri dish.

(Pipettes should be placed immediately in water after using to make subsequent cleaning easier.)

The flasks (or test tubes) of agar shall be melted in boiling water or steam and after melting should be cooled to 45° C. before using.

Pour 10 cc. of the melted agar in each inoculated Petri dish, and by a gentle rotary motion thoroughly mix the agar and the diluted milk. As nearly as possible the same amount of agar should be poured into each Petri dish so that the depth of the agar in all be uniform. If desired, 10 cc. may be measured out from the flask with a sterile pipette.

After the dilution of the milk not more than half an hour should elapse before the agar is poured into the Petri dishes.

After the agar has thoroughly hardened place the Petri dishes in an incubating oven, inverted, in order to reduce the danger of spreaders. While clay tops of Petri dishes are useful for some purpose they are not recognized in the standard methods.

Incubation and Counting.

Incubation.—Only one period of incubation and one temperature is regarded as standard, 48 hours at 37.5° C. In crowded incubators ventilation should be provided.

Counting.—If among the different dilutions there are plates containing from 30 to 300 colonies these should be counted, and the number, multiplied by the dilution, be reported as the final count. All colonies on such plates should be counted, and the numbers averaged. If there are no plates within these limits the one that comes nearest to 300 is to be counted. No plate that contains less than twenty colonies shall be counted, unless it

happens that there are no plates with a larger number of colonies, or unless the numbers in the plates check with other dilutions. If the number of colonies on the plate to be counted is over 300, a part of the plate may be counted, and the whole plate averaged.

Counting shall be done with a lens, magnifying $2\frac{1}{2}$ diameters (or what the opticians call a $3\frac{1}{2}\times$ lens). Nearsighted persons should use their glasses in counting, but farsighted persons should remove them. In case it is doubtful whether certain objects are colonies or dirt specks they should be examined with a compound miscroscope.

Reports.—In making reports it must be borne in mind that with high numbers obtained by the routine method, only an approximation to accuracy can be obtained. Only the left-hand figures of the final numbers are of significance. It is best, therefore, to report only the two left-hand figures of the results, in order to avoid an unwarranted impression of accuracy. For example, when the numbers are in millions no figures smaller than the millions have any significance in the routine analysis of milk. In making the report raise the number to the next highest round number, but never lower it.

In no case shall the count of a single plate be regarded as sufficient for the purpose of grading milk. If a single sample of milk only is to be tested there should be at least three plates counted before a report is made.

Research Methods.

To set standards for research methods is neither practical nor desirable. These methods must be developed in each case by the research worker. It is sufficient simply to point out that the routine methods here outlined will usually be inadequate for research where great accuracy is demanded. Greater care in collecting the sample and a more extended series of dilutions so as to get properly seeded plates will be needed. Special media and special incubation temperatures will also usually be necessary. The Standard Methods, for example, are not such as give a proper count of lactic acid bacteria. Where any line of research requires nothing more than a count of the numbers of bacteria in milk, the routine methods above described shall be used in order that the results be comparable to other bacterial counts, and if any other method than the routine be employed this shall be carefully stated so that no erroneous comparisons be drawn between the reported numbers and the numbers that might be expected from the use of standard routine methods.

Interpretation of Results.

The interpretation of the bacteriological analysis of market milk must depend upon the history of the milk. It is therefore difficult to give any general interpretation. The following are a few significant conclusions.

1. Where the analysis can be made immediately after the milking the number of bacteria enables conclusions to be drawn as to the cleanliness and care in the dairy and the thoroughness in the cleaning and sterilizing of the

milk vessels, or sometimes the presence of cows with infected udders. With properly cleaned and sterilized milk vessels and proper care in the farm and dairy the numbers of bacteria should not exceed 10,000, and may easily be brought down to 5,000. Numbers beyond these in milk analyzed immediately after the milking may be regarded as an indication of unclean dairy methods, dirty and unsterile milking vessels, or to infected udders. Apart from infected udders the factors in dairying that most noticeably increase the bacteria count are unsterile milk vessels, unsterile strainers, unclean udders, and failure to cool the milk promptly.

2. If the milk is properly cooled with ice the numbers should not materially increase in five to seven hours. Communities within five to seven hours of their dairies should, if perfect conditions prevail, be able to obtain milk with nearly as low a count as above indicated. Hence in such communities bacterial counts above these numbers should not be found in properly guarded milk. A count of 50,000 in such a community is an indication either of unsatisfactory dairy conditions or of failure to properly cool the milk during transportation. Night's milk if properly cooled can also easily be brought within these limits if analyzed the next morning. A count of over 50,000 for a community close to the dairies must be regarded as unsatisfactory, and the number should approach the 10,000 mark for high grade milk. In hot summer weather the difficulties of keeping low counts are greater, but even then they need not surpass 50,000 if the milk is properly cooled.

3. Where milk must be a longer time in transportation from the dairy there will inevitably be an increase in bacteria, depending on the length of time and the temperature. Experience has shown, however, that even in these conditions the excessively high numbers that have frequently been found in city milk are in reality due to diseased udders, to dirty dairy conditions, to dirty and unsterile milk utensils, or culpable neglect of cooling. Moreover, such high bacterial counts at the shipping station are frequently traceable to a few dirty dairies whose milk with an abnormally high count contaminates the rest of the supply. Dirty shipping cases and warm temperatures in shipping are responsible for most of the high bacterial counts in city milk. Where the milk from healthy cows reaches the city within twenty-four hours, however, the number should not be over 100,000 in winter or 200,000 in summer, and numbers in excess of this may be regarded as due either to improper dairy conditions, dirty milk vessels, insufficient cooling or perhaps to diseased udders. In larger cities where much of the milk is forty-eight hours in reaching the city, higher numbers may naturally be expected; but even under these conditions there is no good reason why the number of bacteria should reach 1,000,000; and it may mostly be brought down to below 200,000. In such cities, therefore, milk with more than 1,000,000 bacteria must be regarded as im-

properly guarded either at the dairy or on its transit.

4. For a Grade A milk higher demands should be made than for the ordinary grade. The standard set by the Milk Commission for Grade A, viz., of 200,000 for milk to be subsequently pasteurized or for 100,000 to be used raw, is stated by that Commission to be an extreme limit for the most unfavorable conditions. Cities situated near the supplying dairies should demand a much higher standard, which should not allow over 10,000 in bacterial content in Grade A milk in communities favorably situated.

5. For communities situated where ice is not available it may be necessary to accept a milk with a higher bacterial content; but as rapidly as possible the standard should be made to approach the limits as above given.

The Microscopic Method of Analysis.

The practice of counting the bacteria in milk by means of the miscroscope has been in the last few years coming somewhat rapidly into use, and offers several advantages. 1. It is extremely rapid, making reports possible within a very few hours. 2. It is simple, and requires little apparatus. 3. It gives a means whereby the actual numbers of bacteria can be determined, and in this way gives a more reliable count than the plate count, and it also gives some idea as to the kinds of bacteria.

On the other hand, it requires considerable experience to obtain reliable results, and because it does not distinguish the living from the dead it is not applicable at the present time to the study of pasteurized milk. Its manifest advantages for some purposes makes it certain, however, that its use will extend, and for this reason it is included in these Standard Methods.

Various methods of the microscopic study of milk have been described, but that which may be called the *direct microscopic examination* of milk is the simplest and most reliable, and is recognized in this report as Standard. It is as follows:

Samples.—Milk samples collected as above described may be preserved by icing and handled as in the case of the plate method. All samples on which the cream has risen to the surface must be vigorously shaken before preparations are made from them.

Apparatus.—In addition to a microscope and ordinary microscopic slides, stains, etc., the only special apparatus required is a pipette which measures $^1/_{100}$ cc. The most convenient form of pipette is the straight capillary pipette, calibrated to deliver $^1/_{100}$ cc., the graduation mark being $1\frac{1}{2}$ to $2\frac{1}{2}$ inches from the tip. Such pipettes are now for sale by manufacturers, and can be easily obtained. The calibration should be tested by weighing with chemical balances the amount of milk discharged from the tube. Only a single pipette is needed in making a series of tests, provided this is kept clean while in use. In this kind of work cleanliness rather than sterilization is required. Clean towels may be used for wiping the exterior of these pipettes, while their bores may be

kept clean by rinsing them in clean water between each sample. The small amount of water left in the tube may be rinsed out into the milk sample under examination. This method of procedure, while adding a small number of bacteria to each sample, introduces only a theoretical error, tests showing that such bacteria cannot subsequently be detected, and make no difference in the final result.

Preparation of Smears.—One one-hundredth cc. of milk or cream is deposited upon a clean glass slide by means of the pipette above described. By the use of a clean stiff needle this drop of milk is spread over an area of one square centimeter. This may be most conveniently done by placing the slide upon any glass or paper ruled into areas one centimeter square. These marks showing through the glass serve as guides. After uniform spreading the preparation is dried in a warm place upon a level surface. In order to prevent noticeable growth this drying must be accomplished within five to ten minutes; but excessive heat must be avoided or the dry films may crack and peel from the slides in later handling.

After drying, the slides are to be dipped in xylol (gasoline may be used) for one minute, then drained and the slides dried. They are then immersed in 90 per cent grain or denatured alcohol, for one minute or more, and then transferred to a fresh aqueous solution of methylene blue. Old or unfiltered stains are to be avoided, as they may contain troublesome precipitates. The slides remain in this solution from five seconds to one minute or longer, depending upon the effect desired, and are then rinsed in water to remove the surplus stain, and decolorized in alcohol. The decolorization takes several seconds to a minute, during which time the slide must be under observation in order that the decolorization may not proceed too far before they are removed from the alcohol. When properly decolorized the general background of the film should show a faint blue tint. Poorly stained slides may be decolorized and restained as many times as necessary, without any apparent injury. After drying the slides may be examined at once, or they may be filed away and preserved for further reference.

Standardization of the Microscope.—The microscope to be used must be adjusted in such a way that each field of the microscope covers a certain known fraction of the total square centimeter's area. This procedure is simple, with the proper materials at hand. The microscope should have a 1.9 mm. ($^1/_{12}$ inch) oil immersion objective, and an ocular giving approximately the field desired, and should preferably be fitted with a mechanical stage. To standardize the microscope, place upon the stage a stage micrometer, and by the selection of oculars or adjusting the draw tube, or both, bring the diameter of the whole microscopic field to .205 mm. When so adjusted, the microscopic field will cover almost exactly $^1/_{300,000}$ of a cubic centimeter of the milk (actually $^1/_{302840}$. This means that if the bacteria in one field only are counted, the number should be multiplied by 300,000 to give the total

number in a cubic centimeter. If the bacteria in a hundred fields are to be counted, the total should of course be multiplied by 3,000.

Inasmuch as it is difficult to count bacteria lying near the margin of the microscopic field, it is much better to have an eyepiece micrometer, with a circular ruling, 8 mm. in diameter, and divided into quadrants. This will give, in the microscopic field, a smaller area within which the bacteria may be seen most sharply, and which may be more easily counted. Such eyepiece micrometers are now manufactured by laboratory supply houses, and may be easily obtained.* In the use of this eyepiece micrometer the inner circle, by the adjustment of the draw tube, should be made to cover a circle with a diameter of .146 mm. In this case this inner circle will cover $^1/_{600,000}$ of a cubic centimeter of milk, meaning, of course, that the number of bacteria in a single field should be multiplied by 600,000, or, if a hundred fields are counted, by 6,000, to obtain the number per cubic centimeter.

The number of microscopic fields to be counted will depend somewhat upon the kind of data that is desired. If this method is to be used simply for the purpose of dividing milk into grades, it will in most cases be unnecessary to do the actual counting, since a Grade A milk will show field after field without any bacteria at all, while a Grade C milk will show the field crowded with bacteria. In all doubtful cases, however, counting should be done, and there should never be less than thirty fields counted in order to have reliable results. Counting thirty fields is not so tedious a task as would seem to be, since in ordinary milk the number of bacteria in each field is small, and the counting may be done very rapidly.

Counting.—Counting the bacteria in such a smear may be done in two ways. 1. The number of groups of one or more bacteria present. 2. The number of individuals. The second, of course, is really the correct count of the number of bacteria, but the former will give a count much closer to that obtained by the plate count, since the colonies upon the plate represent groups of bacteria rather than individuals, each group growing into a single colony, only Extensive tests have shown that there is a fair correspondence between the number of groups reported by experienced observers and the number of colonies that may grow in plates made from the same milk, although there are occasionally discrepancies of considerable extent. These discrepancies are caused by variations in judgment as to what constitutes a group, variations in the extent to which groups break up in the dilution waters when the smears are made, and the presence of dead bacteria or of bacteria which do not grow on the plates. Some experience is needed by the microscopist in determining just what should be counted. In high grade milks, an inexperienced person is apt to fail to recognize differences between bacteria and other minute objects. This results as a rule in an over-count by inexperienced men. In milk containing many readily recognizable

* Listed by Bausch and Lomb Optical Co.

bacteria in each field the inexperienced man is apt to overlook some of them, giving an undercount. These difficulties are overcome, however, by training and experience.

Interpretation of Results.

It must be recognized that the results obtained from the microscopic record give a closer approximation to the actual number of bacteria present in the milk than those obtained by the plate method, since the plate method will count as one, either a single bacterium or a group which may sometimes contain a hundred or even more individuals. Inasmuch, however, as the plate count has become a method of analysis that is well known and commonly applied, it becomes desirable to know as closely as possible what relations there may be between the plate count and the microscopic count. Experience has shown that the count of individual bacteria is ordinarily 1.5 to 8 times as great as the plate count, the ratio between the two being largely dependent upon the size of the clumps of bacteria present. Where the bacteria are mostly isolated, the ratio of the two counts would be much closer than where there are present long chains of streptococci or masses of cocci. After one has had a little experience in counting clumps it is found that the number of groups shown by the microscope, agrees fairly well with the number of colonies shown by the plate count, though even here there are occasionally discrepancies, due among other things to the appearance in the microscope of kinds of bacteria which fail to grow in the culture media used in making plates. In all cases, however, the direct count of raw milk will give a much closer approximation to the actual numbers of bacteria than the plate count. In view of these facts it is difficult to interpret one count in terms of the other; but a few suggestions will give a fairly satisfactory idea as to how the two may be related.

Grade A raw milk, which should have less than 100,000 bacteria per cc., will not show more than three to four small clumps of bacteria for each 30 fields of the microscope where the diameter of the fields is .205 mm. Such milk also ought not to contain more than 500,000 individual bacteria per cc. when counted by the microscope. For Grade A pasteurized milk (which should have less than 200,000 per cc. by the plate count before pasteurization) the microscope should not show more than six to eight clumps per 30 microscopic fields, and not more than 1,000,000 individual bacteria when counted with the microscope.

Grade B milk, which is supposed not to have more than 1,000,000 bacteria before pasteurization, when counted by the plating method, should not show more than 20 individual bacteria per fields, where the diameter of the fields is .205 mm., and not more than three to four groups of bacteria per field.

While the above relation between the plate count and the microscopic counts cannot be relied upon as having a very great amount of accuracy, it will serve to give a general idea of

the ratio between the two under ordinary conditions, and may serve as a guide in the use of the direct microscopic method.

The direct microscopic method is not as yet recommended by this committee as a method of estimating the numbers of bacteria that are present in samples of milk. For this purpose the plate method, which has long been in use and is fairly well understood, is still recommended as the standard method to be employed. For the purpose of rapidly dividing raw milk into a series of grades, in such a way that the results can be obtained in the quickest possible time, the direct microscopic method seems to be extremely useful, and the results which are obtained will in nearly all cases agree with those obtained by the plate count, and probably in all cases will give a closer approximation to the fair grading than the plate count can do. For these reasons the use of the direct microscopic method is extremely valuable at the dairy end of the milk route, where the farmer wishes to know the kind of milk he is producing, or the purchaser at the shipping station wishes to know the kind that he is receiving from the farmer. It is of less value at the city end of the milk route, especially if pasteurization of the milk has been introduced anywhere along the route. It is especially useful in the data it gives concerning the kinds of bacteria present in milk, since it sometimes enables the farmer quickly to pick out from his herds such cows as are discharging large numbers of streptococci, thus giving a very efficient means of protecting the milk supply from this type of organisms that are today recognized as suspicious and decidedly undesirable.

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PLAIN COMMON SENSE.

Dog fanciers have long noted that when a house-dog begins to get fat and wheezy it is pretty apt to be attacked by a stubborn skin disease. In such a case they cut down the diet and increase the open air exercise, thus relieving the over-burdened body of poisonous substances.

The sin of gluttony is common and therefore much condoned, but like every other violation of nature's laws has a penalty. Fat inefficiency, sluggish mentality, the reddened nose, the pimpled face, certain of the chronic skin eruptions, and much fatigue and nervousness are due to the abuse of the digestive apparatus. Rich, indigestible foods in large quantities, highly seasoned to stimulate the jaded palate, are forced into a body already rebellious from repletion. Exercise is largely limited to walking to and from the table and bodily deterioration proceeds rapidly. Many an overfed dyspeptic, suddenly dragged by the stern hand of circumstances from a life of physical ease and plenty and forced to work out of doors suddenly discovers that his semi-invalidism has gone, that a chronic skin derangement of many year's standing has disappeared and hat a new vigor and zest of life has been given him.

Not everyone can spend his whole time in the open air but a certain amount of exercise and plain wholesome food in an amount not exceeding the body's needs can be had by almost everyone. Simple moderate diet and exercise make for health. These are not faddish food theories: they are just plain common sense.

BIBLIOGRAPHY OF TUBERCULOSIS IN ITS RELATION TO HOUSE INFECTION AND HOUSING BETTERMENT.

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We are pleased to present to our readers this extensive and important bibliography. It should prove of great usefulness to all departments of public service.

THIS bibliography covers the recent literature of the medical and social sciences (especially that of the last fifteen years) in so far as it deals with the correlation of housing and tuberculosis. It has proved impracticable to include titles from the following associated fields: infection through house-dust, vitiated air, or house insects; the viability of tubercle bacilli in dark rooms, family infection, racial susceptibilities, house disinfection, or the housing of special classes, *i. e.*, the insane or the criminal. The literature on each of these latter divisions is large and pertinent. Many references to it will be found in the general articles listed in Section I.

Section II probably includes most of the important original local studies made of the correlation of tuberculosis with housing conditions. It is likely, however, that some valuable studies are lost in forgotten annual reports for, in several instances, the anti-tuberculosis associations and boards of health of American cities replying to my letters of inquiry, concerning local investigations, have failed to make mention of important studies made within their own boundaries. Important European official reports are quoted in Newsholme: "The Prevention of Tuberculosis"; Dewsnup: "Housing Problem in England"; Sykes: "Public Health and Housing" and by other writers in Section I. They are not included in the list because of their relative inaccessibility.

Section III on "Improved Housing, with Special Reference to Tuberculous Families," includes only a brief selection of the pertinent titles. Most of the literature upon the care of the consumptive deals to some extent with the housing of the patient. All of the literature of housing betterment is directly or indirectly suggestive of means of preventing tuberculosis. The selected titles in Section III are, therefore, in the main such as by their wording might be confused with titles belonging in Sections I and II. A few useful supplementary titles were inserted mainly because of their availability.

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Discussion by P. Juillerat, G. Petit, and S. Bernheim.

MARCUSE, JUL. Die Wohnung in ihre Beziehung zur Tuberkulose. Brauers Beitrage, II.

MARIE DAVY, F. Les maladies de maison. Leur prophylaxie par l'hygiène ménagère et la désinfection. III Internat., Kong. für Wohnungshygiene, Bericht. Dresden, Oct. 1911, p. 449–471.

Good summary of French studies of tuberculosis and some other preventable diseases.

NATIONAL ASSOCIATION FOR THE PREVENTION OF CONSUMPTION AND OTHER FORMS OF TUBERCULOSIS, (BRITISH). Transactions of the annual conferences.

The conference of 1914 contains valuable papers on housing and tuberculosis.

NATIONAL ASSOCIATION FOR THE STUDY AND PREVENTION OF TUBERCULOSIS, (AMERICAN). Transactions of the annual meetings.

Pertinent articles in all volumes excepting V and VI. (Some of the best have been listed under the authors' names.) Volume XI for 1915 contains specific articles by I. W. Brewer, C. J. Hastings and L. Veiller, p. 328–349.

NEWSHOLME, ARTHUR. The prevention of tuberculosis. London, Methuen, 1910, XI, 429 pp.

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Ransome, Arthur. Consumption, a "filth disease." The Lancet, Jan. 1, 1898, p. 14–17.

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Risler, M. Georges. Sur les habitations à bon marché et la tuberculose. 15th Internat. Cong. on Hygiene and Demog., Transactions. Washington, Sept. 23–28, 1912, IV, p. 492–497.

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Rubner, Max. Die Wohnung u. ihre Beziehung zur Tuberkulose. Die deutsche Klinik, XI, 1903–7, p. 379–414.

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De la salubrité des habitations. L'état de la lutte contre la tuberculose en Allemagne Cong. Int. de la Tuberc., Memoire, Paris, 1905, p. 245–250.

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Schutte, Friedr. Wohnungswesen u. Tuberkulose.

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Appendix C by Edward M. Hartwell, on tuberculosis and density of population in Boston, p. 58–59.

Bruck, E. and Steinberg. Die Verbreitung der Lungentuberkulose in Breslauer Familien, Wohnungen u. Werkstätten. Z. f. Hyg. u. Infektkr, LXXI, No. 2, p. 177–222.

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Cincinnati Anti-Tuberculosis League. Annual report of Superintendent for February 9, 1916. Unpublished.

Contains report of housing investigation of three districts by Mr. Mees. See also studies listed under names of Robinson and of Withrow.

Cleveland. Department of Public Welfare. An investigation of housing conditions of Cleveland's workingmen. Monograph Series No. 1, April 1914, 34 pp.

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Book Reviews.

The Pasteurization of Milk from the Mechanical Viewpoint. *Chas. H. Kilbourne. John Wiley & Sons, Inc., New York. 1916. Pp. 241. Illustrated.*

The milk dealer will surely become antagonistic while pursuing the first few pages of Mr. Kilbourn's little book, but as the suspicious natured inspector becomes less in evidence and the good sound sense of the man of practical experience begins to pour out information backed by chemical and bacteriological tests, showing a keen realization of the seriousness of the obstacles ever confronting him, he is immediately won over.

Mr. Kilbourn seems to have fairly brought out the advantages and disadvantages of each type of commercial pasteurizer discussed and gives tables of results from each type both as to bacterial content and percentage elimination and the effect of different temperatures on the cream line. The bad effect of pumping and agitating milk, particularly when hot, and after being pasteurized, is well discussed.

The chapter on cleaning of apparatus and containers is good, although in the tables of bacteriological results the milk in most cases had many more bacteria when it reached the bottle than when it left the cooler (average of all tests almost three times as many) showing that the good advise of the author was not always followed.

The author discusses in detail the various types of heaters, holders and coolers with the manufacturers' drawings of each; also two types of temperature controlling and recording instruments.

The small dealer who is just contemplating pasteurization can ill afford to be without this little guide and dealers who have been pasteurizing for years can surely get some ideas as dearly purchased by others as their own knowledge has been in the hard and expensive school of experience.

S. G. Bixby.

Eat Your Way to Health. *By Robert Hugh Rose, M. D. Published by Robert J. Shores, New York. 1916. Net $10.0.*

Doctor Rose has written his book in a very simple and frank manner, which can be very well understood and interpreted by the general public, it not being necessary to be an expert in dietetics to get his very definite meaning. It is this characteristic which makes the book very important, as otherwise the reader at large might find it difficult to digest and would be unwilling to try the recommendations that Doctor Rose has put forth.

While the subjects of foods and diets are discussed in a simple manner, scientific truths which have been developed by leading experts along these lines through their various experiments are maintained throughout the book. The author tells us the pleasures that are obtained through a simple fare; why and what we should eat; how to estimate food values; the vital importance of proteins; losing the superfluous and gaining the desirable.

On the whole, the book ought to be a very popular one and while it is not written in an elaborate scientific manner, it no doubt would be enjoyed and appreciated by the scientist.

James T-B. Bowles.

Health Department Reports and Notes.

REPORTS.

Buffalo, New York.

Unlike most reports the 1915 annual report of this city is distinctly a report of the sub-departments. After an excellent preface devoted to a discussion of the duties and expansion of a modern health department and to pointing out the value of the work done by the various bureaus, Health Commissioner Fronczak leaves the discussion of the results of such work to the chiefs of the bureaus, themselves.

It is interesting to note that the report of the Secretary shows that more than twice the amount of money is expended by the Bureau of Child Hygiene than is expended by any other bureau. The per capita expenditure for health work by this city of 462,000 population is approximately forty-eight cents.

The report of the Assistant Commissioner of Health, Doctor Schaefer, comprises the hospital report and the report of the Bureau of Child Hygiene of which he is chief. The hospital report emphasizes the common and absurd condition, namely the occurrence of "repeaters" in the hospitals. This term is not applied to malingerers, but to patients who have been discharged as cured for one disease, returning with the sequelae of that disease some time later. This necessarily involves additional expense and great economic loss. It is advocated as a remedy of this needless waste to establish a convalescent hospital, preferably a convalescent farm, where these people can be sent while convalescing, and at the same time perform supervised service and work. It is further suggested to establish a social service branch for all such city cases. The Bureau of Child Hygiene comprises Infant Welfare, Midwifery, Children's Institutions, Medical and Dental School Inspection, Dentists and Child Labor Divisions. The principle work is directed to potential mothers, expectant mothers and mothers. The first class is reached by numerous "Little Mothers' Leagues" which during the reported year enrolled some 1,800 members. Efficient midwifery seems to prevail though there evidently is conflict between the county and state authorities over the revocation of licenses. It is hoped that midwifery may eventually be overcome, and solving of this problem seems to hinge on the possible expansion of the visiting nurses association. All midwife births are followed up, and the results are singularly gratifying. Excellent results have been accomplished from the establishment of milk stations, the dispensing of free milk, food and medicines, and the continuance of the infant welfare stations. The extensive and painstaking work carried out at the Detension Home of the Juvenile Court, which comprises physical examination and psychological work, is yielding encouraging results. The demands on the Division of Mental Hygiene services is increasing. The aims of this division are as follows: 1. Discovery of backward and subnormal individuals; 2. Diagnosis of mental and physical defects; 3. Grading of mental and physical defectives; 4. Assistance of parents, physicians and others to the best means of improving the child; 5. Coöperation with the schools in selecting pupils for their special classes and examining them from time to time. 6. Recommending procedures for the relief and correction of mental and physical defects. 7. Instruction of the public in the necessity of custodial care for all cases that are potentially dangerous to society. 8. The endeavor to show the city that prevention of feeble-mindedness is practicable, while cure is impossible. The recommendations of this division are in accordance with their aims. All other divisions of this bureau have carried out their work with unusual capability. The work of the bureau is an excellent example of what can be accomplished by efficient organization and a keen insight as to what can eventually be accomplished in the health of a city by applying concrete and modern methods in controlling the health of the children.

The Bureau of Vital Statistics and Communicable Diseases presents an excellent report, under the able supervision of Dr. Franklin C. Gram. A study of Buffalo's comparative statistical table shows that in 1882 the first year when accurate records were kept the death-rate was 24.06 and the birth-rate was 27.47 per 1,000, with a population of 175,000; in 1915 the death-rate was 14.83 and the birth-rate 27.45 with a population of 462,000. Perhaps the most significant feature of this reduction is in the infant mortality rate, particularly in deaths under one year during the three summer months, the figures for 1913, 1914, and 1915 being 584, 494, and 370 respectively. Nine hundred sixty cases of diphtheria were reported during the year with 78 deaths. This is justly considered too high a mortality, and the fault is the tardy or non-reporting of this disease, due to home diagnosis of sore throat, fear of quarantine, or reason similar to those advanced by antivaccinationists. Two hundred fifty-nine cases of typhoid fever with 46 deaths were reported. "Measles, 'Only Measles', the despised trouble maker for children, claimed 51 deaths out of 4,904 cases; while scarlet fever, which inspires awe, killed only 25 out of 662 cases." Mumps and chickenpox both ran over 1,000 cases. One thousand four hundred forty cases of tuberculosis in all forms were reported during the year with 709 deaths. Its is stated that deaths from pulmonary tuberculosis have not increased above the proportionate increase in cases of the disease reported. Complete and excellent tables accompany the report of this Bureau.

The Bureau of Food and Drugs, with limited facilities and restricted authority, have so well organized their forces that a general cleanup of places where food is produced and handled has been effected. Considerable coöperation seems to be exhibited here, and the few chronic offenders are reported to offend more from indifference than from maliciousness. The Reports of the Bureaus of Sanitation and Plumbing and Drainage complete this report, and these show that this work is being carried out in the same efficient and active manner that is exhibited by the other Bureaus.

In conclusion let us state that this report shows that the Department of Health of Buffalo is doing most creditable work, and in its organization and methods might well serve as an example to other departments of health throughout the country, particularly in the field of Child Hygiene.

Spokane, Washington.

We often wonder why it is that the average annual report of a city health department is bound and made up in a style so somber and nonconducive to stimulate interest in the lay mind. As a consequence it is surprising how refreshing it is to take up and read the report of Spokane, where attention has been paid to typography, illustration and general make up. Attractiveness such as this may seem to some petty and superflous, but it assuredly tends to stimulate interest and local pride, and such health department publicity is woefully lacking in the average American city.

With just pride the department points first to its extremely low infant mortality rate of 76.6 per 1,000 births. Referring to the mortuary table, it is found that there were 153 deaths under one year of age, 100 of which were due to premature birth, congenital debility, or other causes peculiar to early infancy. In consequence of this, it is advocated that a greater amount of attention be given in the way of proper instruction to prospective mothers.

A decrease of 23 per cent. is recorded in deaths from diarrhea and enteritis. Attention is called to the increase in organic heart disease, Bright's disease and cancer.

The total deaths numbered 1,165, giving a rate of 8.14 per 1,000 population if based upon the population estimate of 142,990 by the United States Bureau of Census. It is felt however that this estimate is too high. Based upon the Chamber of Commerce census however of 120,000 the rate becomes 9.70. In either case the rate is most commendable.

Vital statistics evidently have been carried to a high degree of accuracy and refinement. The department feels sure all deaths are reported and that 95 per cent. of the births are reported. In an effort to obtain 100 per cent. reporting, a

plan has been adopted of sending a certified index card to the mother, made sufficiently attractive to arrest attention and stimulate inquiry by the mother at the health office.

In the matter of sanitation and personal hygiene, the educational method of impressing the child with its importance by exhibits is being continued. In connection with this method, Doctor Anderson, the Health Officer, states:

"We cling to the idea of impressing the child, for it seems that our greatest hope of ultimate success is to train the child so to live that when he reaches manhood his habits, which we presume will then be permanently fixed, will be right habits. Through no other means can routine of personal hygiene, physical sanitation and civic cleanliness be more permanently fixed, and the public be delivered from the terrible scourge of preventable diseases which are today causing more suffering, more poverty and more death than the great European war. This view we hope to fix in the minds of the coming generation through the medium of education, as to the inevitable consequences of carelessness."

Contagious diseases were comparatively few during the year. In regard to the control of communicable disease, particularly in the case of measles and whooping-cough, where the problem of control is a difficult one because of the fact that absence from school influences the child's scholastic standing, it is suggested that the child be credited with school attendance for each day actually lost by contagious diseases, if such absences be certified by the health officer. It is true that this procedure is open to abuse, but the health officer believes that such uncertain possible abuse will be counterbalanced by the good obtained therefrom. It is also advocated that in the case of whooping-cough, a disease which demands fresh air, that the wearing of colored arm bands be made compulsory by those infected, thus warning other children of the proximity of contagious disease. It is also suggested to place a premium on the obeying of rules and regulations in the control of infectious diseases, such as possible the placarding of a home where such regulations are not adhered to.

Extensive work is being carried out in regard to food inspection and control. Of particular interest in the sub-reports are charts depicting the improvement of the milk supply during the last two years. Excellent tables accompany this report. Of especial interest is one of the preface pages which contains definite data relative to the statistics of the city in all departments of public service.

Savannah, Georgia.

This southern city reports a 1915 death-rate of 19.39 per 1,000 population, a rate of 11.59 attributed to the white population, and 26.39 to the colored. Strangely, though the white death-rate is decreasing, the colored death-rate has increased since 1913 from 24.71 to 26.39. No doubt this is partly due to better and more complete vital statistical data, yet it makes the disparity between the rates more obvious. As is generally the case in the south, the excessive colored death-rate is attributed to the fact that the health department does not throw around the colored population, particularly in the congested districts, the same safeguards that are placed around the white. This condition is manifested most noticeably in the lack of any building laws applicable to the Negro, naturally resulting in bad or complete absence of sanitary facilities, which, consequently, according to the report, cause the excessive mortality among the colored people from tuberculosis and pneumonia. In this instance the colored death-rate from the former is four times and in the latter three times as great as among the white population. This experience unfortunately seems to be common to most southern cities. To quote the health officer, Dr. W. F. Brunner, in this matter:

"When a child is born, the white child has got four chances against the Negro's one to reach his first birthday. Even before the birth of the child, the white baby has a five-to-one chance of being born alive over the Negro, and, again, your health officer urges that a commission be appointed to look into the sanitary and moral evils which surround the Negro. The colored and Negro people are advancing rapidly, but without the sanitary and moral support of the controlling element, namely, the white people, his progress must be retarded."

Tuberculosis caused 225 deaths, 28 white and 197 colored; pneumonia 126 deaths, 30 white and 96 colored; and this variance in a general way applies for all the principal causes of death. It is worthy of note that there were no outbreaks of any of the transmissible diseases. Four deaths were reported from diphtheria, the lowest number yet recorded; no deaths from scarlet fever; one death from measles, though this disease is not reportable; and four deaths from whooping-cough. Typhoid fever claimed 7 deaths among the white and 13 among the colored population. Only one case of smallpox was reported and this was brought in from the outside, which speaks well for thorough vaccination throughout the city. In this connection it is emphasized that the Negro is not hiding this disease any longer, and is obedient and appreciative of the sanitary regulations instituted to combat the spread of this disease.

Difficulty seems to be experienced in obtaining complete birth returns from the physicians and midwives. Not more than 80 per cent. of the births are reported. It is unfortunate that there is no evidence from the report of infant welfare work throughout the year, nor is there any data published from which one could determine the extent of the infant mortality.

During the year extensive work was carried out with the purpose of establishing a high grade of purity for the Savannah water. The city water supply is from artesian wells. Examination was made of all sources of supply and conduits, with the result that it is hoped to bring the standard of purity up to and better than that adopted by the United States Public Health Service for interstate carriers. It is evident by a study of the reports of the sub-departments that their work is being carried out in a thorough and scientific manner.

The most striking feature of this report, and of the most of the recent reports from the cities of the south, is the active and sincere desire to improve the health status of the Negro—a task made difficult by ignorance, racial apathy and prejudice. Education and coöperation seem to be the chief points of attack, and though the process may be long and tedious, the results will surely be worthy of the effort.

Edmonton, Alberta.

With the advent of war many of the Canadian cities have been forced to face new conditions which have to a greater or less extent seriously affected the work of the department of health. Among these changed conditions may be mentioned the decrease of the population, the decrease of the staff of the department necessitated by a decreased financial appropriation, the withdrawing of many physicians from their local practices for war service, and the falling off of employment in the city itself. These conditions have necessarily resulted in a certain laxity in the enforcement of some of the sanitary regulations which less directly influence a city's health. Yet in spite of this, this city of some 60,000 inhabitants reports a low death-rate of 8.23 per 1,000 population. Nearly 75 per cent. of the 2,079 cases of communicable disease reported was due to measles, and fortunately this disease seems to have been the only one of epidemic proportions. During the year, 55 cases of typhoid were reported, 31 of which were city cases, which upon analysis showed that most of the cases developed from contaminated well water, or the use of river water below the sewer outlet. Forty-four cases of tuberculosis were reported, only 2 of which could properly be called city cases. Since it is rare that a patient can assist financially in his cure, the department rightly feels that it is an injustice to the city to be made to attend to these outside cases, and urges either the establishment of a provincial sanitarium or the reimbursement by the government for such care as the city gives. All the cases were in the advanced stages, and 44 deaths occurred, which seemed to imply that a great many cases in the earlier stages are not reported, and that the "same reprehensible apathy, indifference or prejudice regarding the reporting of this disease exists among physicians here, as elsewhere." The infant mortality rate per 1,000 births of 89.7 compares favorably with other years, and it is due to the marked reduction in deaths from summer diarrhea, which is attributed to the improvement of the milk supply. In closing it is interesting to note the increase in the birth-rate per 1,000 population. In 1913 the rate

was 23, in 1914, 29, in 1915, 33.6. This, it is felt, is due mostly to the fact that a great many births of children of enlisted men have been recorded in order to obtain the patriotic allowance, which only serves to emphasize the previous laxity in the reporting of births.

Lynn, Massachusetts.

It is with a spirit of satisfaction that this New England industrial city of some 98,000 records an average death-rate for the last five years of 12.14, which varied from 12.60 in 1911 to 11.94 in 1915 per 1,000 population. The average for the previous five-year period was 14.11. It is gratifying to note that there were marked reduction both in the number of cases and in the number of deaths of three of the most important fields of disease with which a health department has to deal. The number of deaths among children under one year of age shows a decrease of 23 from the number reported in 1914. The Board of Health advocates the employment of two school nurses in order to further diminish this rate. Typhoid fever, with 61 cases reported during the year, showed a decrease of 18 cases since 1914. Only three deaths are recorded, which is the lowest number in the history of the city. The result is attributed to the constant watch over the milk and food supply. Tuberculosis, with 109 deaths or a death-rate of 1.10, shows practically a constant diminution of mortality during recent years, and the work carried out by this city in this connection is admirable. It is interesting to note the excellent photographs accompanying this report which well illustrate the activities of the department.

Newport, Rhode Island.

The 1915 annual report of Newport gives for this city of 31,209 population a death-rate of 11.69 per 1,000 population. During the year the general health of the city was good, and at no time did any disease become particularly prevalent. Deaths from communicable disease aggregated only 6, 4 from typhoid, and 1 each diphtheria and whooping-cough. This summation excludes tuberculosis. The number of cases of scarlet fever and diphtheria, 19 and 6 respectively with the lowest numbers reported since the board was constituted in 1901. Not one case of the seven reported cases of typhoid fever is attributable to the milk or water supply. Fifty cases of tuberculosis were reported with 18 deaths. Deaths among infants under 1 year of age numbered 42, which would indicate that the 1915 infant mortality rate would be considerably lower than previously, though, since the birth reports are incomplete, no rate has been calculated. Among the several excellent sub-reports, that of the department of Dental Inspection is worthy of note, and since the installation of this department four years ago great improvement has been made in the general care of the children's teeth.

Lowell, Massachusetts.

The thirty-eighth annual report of this city records the comparatively high death-rate of 17.12 per 1,000 population. This city is strictly industrial, with a large foreign population, which probably partially accounts for this excessive death-rate. In this connection it is interesting to note that of the 1,820 deaths (still-births excluded), 324 were due to diseases of the respiratory apparatus, exclusive of tuberculosis which claimed 133. Diseases of the circulatory apparatus also claimed a large portion of the total deaths, 326 being reported, of which acute endocarditis claimed 73, organic diseases of the heart 110, and affections of the arteries 120. Diarrhea and enteritis caused 158 deaths under two years of age. There were 460 deaths of children under 1 year of age, which is an increase over the record of last year. The death toll from 112 cases of typhoid was 18, which is the greatest number of each since 1910. The only marked decrease among the more common communicable diseases is in the case of measles, there being 164 cases reported with no deaths, as compared with 531 cases in 1914, and 619 cases in 1913. It is indeed most difficult to acquire an accurate impression of the health work of this city of 105,000, because, though the report is profuse in vital statistics and tables, no rates are given throughout the report, and unfortunately no discussion of any kind accompanies any of the departments' reports. It is the dearth of such material which makes such a report uninteresting and scarcely intelligible to the lay mind. Fortunately an index is supplied.

NOTES.

Why Local Boards of Health Fail.—"The shortcomings of local public health officials throughout the country, and the inefficiency of their work, are common knowledge among trained, thoughtful sanitarians and are beginning to be appreciated by the public," states the October issue of the *Public Health News*, published by the New Jersey State Department of Health, in another critical discussion of local boards of health. The infantile paralysis outbreak has served to accentuate the demand for better health service. Believing that the parading of failure is a necessary step in securing improvement in this branch of public service, there are enumerated a few of the sore spots in local health administration. These are in part as follows:

1. Local board members lack interest in health work. It is obvious that no community can expect first class health work when the officials charged with the enforcement of health laws lack interest in public health problems. It is not the health department's purpose to have this apply to all local boards, but more particularly to township boards of health, where membership is acquired by virtue of election to other offices.

2. Board members lack knowledge of health work. Where interest is not lacking and even where zeal may be commendable the lack of knowledge on the part of the health board members often leads to wasteful expenditure of money and effort, and in this new occupation requiring highly specialized knowledge local health board members who attempt to do this kind of work without acquiring such knowledge are doomed to failure.

3. Many local boards of health fail to appoint trained executives. If specially trained executives were appointed failures due to lack of knowledge on the part of the board members would be avoided.

4. Part time executives fail. The bulletin expresses the belief that no matter what a man's knowledge or experience may be, he is sure to fail in public health work if he attempts it as a mere incident to his regular occupation. The part time health officer is usually a physician who depends upon his practice for a living and does the health work merely as a side issue. A health official in this position may be called upon to prosecute some of his own patients for the violation of health laws and no community should subject its officials to the moral strain of choosing between public duty and private business.

5. Political expediency too great a factor. The mixing of politics and public health results in ineffective health work. The practice of paying political debts by appointment to membership on local health boards and to positions with such boards is severely condemned.

6. Local board members lack courage. Knowledge alone will not make a good health official unless it is backed up with moral courage.

7. Local boards lack funds for health work. In New Jersey the law provides a minimum appropriation for local health work of five cents per capita. Trained health officers cannot be employed, laboratories established, or other pressing needs provided for without sufficient funds. An appropriation for health work of from fifty cents to one dollar per capita is advocated.

8. Territorial jurisdiction insufficient to permit the most effective work. The enlargement of health administration units, either through legislative action or through coöperative organizations, in such instances where the population of a sanitary district is so small that even an appropriation of one dollar per capita would not provide sufficient funds for adequate health work, is a prime necessity in order to provide the minimum units of population required for the most economical administration of adequate local health activities. The New Jersey Department of Health advocates sanitary districts with a population of twenty to twenty-five thousand.

9. Local boards acting independently lack coördination. Under the present system health administration is a law unto itself. If the interests of society as a whole are to be best served all of these sanitary districts must work in coördination in health administration.

10. Local boards lack the support of public opinion. It is stated that with all its faults local health administration is just about as good

as the public demands. Boards of health like other public officials seldom advance much more rapidly than public opinion advances. A community that is so lacking in community spirit and so indifferent to its own best interests as to permit the appointment of incompetent, uninterested members to its board of health does not deserve more than it gets. It gets just what it deserves.

In conclusion it is stated:

"Local boards of health and the communities they serve must share the responsibility for this rather deplorable state of affairs. They must likewise share the responsibility for turning their failures into successes. In effecting these desirable changes, boards of health should take their proper place at the head of the procession, and, through health-educational activities, mold public opinion to support them in effective health work."

✱

Result of the Sickness Survey in Boston.—The October monthly *Bulletin* of the Boston Department of Health is partially devoted to the publication of the result of the sickness survey carried out in that city last July by the Metropolitan Life Insurance Company. This was the fourth examination of this type attempted in this country. In Boston, not only the statistics of persons insured by this company were tabulated, but also statistics of a considerable number of persons not insured by the company, thus assuring a representative statistical result. It is needless to explain the benefits to be derived from such a survey; they are manifold and obvious: nor does space permit us to give the exact findings determined by this survey, though to a great extent these were most favorable. The principal findings are set forth as follows:

"1. Close to 2 per cent. of the population of Boston were found to be sick. This proportion is smaller than that registered in the surveys elsewhere.

"2. Slightly more than 90 per cent. of the total cases of sickness involved disability for work.

"3. The principal diseases responsible for the sickness registered were rheumatism, organic diseases of the heart, tuberculosis of the lungs, diseases of the kidneys and diseases and conditions of the puerperal state.

"4. The proportion of cases sick less than one month up to the date of the survey was only 26.3 of the total. This was slightly higher than the finding for Rochester but considerably lower than North Carolina. The relatively small number of acute infectious diseases accounted for this condition.

"5. Of the total cases 72.9 received medical attention; this is a higher percentage than elsewhere. This finding reflects the excellent medical facilities of Boston. Hospitals and dispensaries provided a large proportion of the total amount of medical care.

"6. The economic loss resulting from sickness in Boston is considerable, involving the loss of earnings for about seven days per person per year."

✱

Accuracy of Poliomyelitis Diagnoses.—In a righteous effort to refute certain charges brought against the New York City Health Department intimating that the recent epidemic of poliomyelitis was largely a creation of the department and that a large proportion of the cases listed as poliomyelitis were not that disease at all, the Department of Health of New York in its weekly bulletin of November 18, publishes the result of the study of the diagnoses of a great many cases of this disease, thus determining their accuracy.

The large number of individuals unfortunately left with some degree of permanent paralysis is in itself sufficient to refute this absurd accusation. Thus, it is cited, that out of 2,715 cases, followed up carefully, in their homes, 1,885 were found to have serious paralysis of one or both lower limbs, and to be unable to walk; 530 more were partially paralyzed in the lower limbs, although still able to walk; 273 had one or both arms totally paralyzed.

In compiling the records of diagnoses, the study entailed some 4,474 cases sent to the hospital as "probably poliomyelitis." Of this number, 96 cases after being observed in the hospital for some time, were discharged as "no illness." In 49 additional cases the patients' illness proved to be other than poliomyelitis. Thus, disregarding the 96 cases sent in for observation as a matter of precaution, it was found that actual mistakes in diagnosis occured in only one per cent. of the cases. There is an appended table which shows the final diagnosis of the 45 cases above mentioned, which makes it

quite clear that the symptoms of many of the conditions there enumerated resemble those of poliomyelitis, and that a prompt differentiation is often out of the question. Attention is called to the large proportion of cases manifesting meningeal symptoms, and of acute infections with respiratory symptoms. "Altogether," states the bulletin, "the figures above mentioned and the table here given testify to the high degree of diagnostic accuracy attained during the recent epidemic."

✱

The Prosecution of Physicians, Undertakers and Midwives.—The Virginia Health *Bulletin* of October 10, makes it evident that the Virginia State Board of Health is hereafter intending to take a most strict stand on the reporting of births and deaths. The *Bulletin* comments as follows:

"Of a total of 5,026 birth certificates which reached us with the August reports, 1,197, or nearly 24 per cent. were certificates, that were not reported within ten days as provided by law, or even during the month in which they occurred. This proved that there were during August 1,197 violations of the law by physicians and midwives.

"With these facts before us, we have unwillingly, but finally, decided that the gentle and courteous measures we have used, besides putting upon the state and local registrars a large amount of unnecessary work to secure the certificates, even though late, is not appreciated by a considerable number of physicians and midwives. We are now accumulating evidence and entering upon the prosecution of violaters of the law.

"Our field supervisor, Mr. Bush Wilkins, has recently secured the conviction of physicians in Northumberland and Richmond counties, with whom we had exhausted all reasonable efforts to secure compliance with the law. A number of other cases will be taken up against physicians, undertakers and midwives, in various portions of the state, as rapidly as they can be reached, and when the local registrars neglect their duty in taking action themselves.

"We are preparing to turn over to the legal authorities of Norfolk, Richmond, Petersburg and other cities, evidence sufficient to secure the conviction of a number of leading physicians. All of these cases will receive local and general advertisement, as the convictions occur.

"To the local registrars we would say that the procedure against physicians who violate the law is as simple as trying cases of other misdemeanors. Simply summon the fathers and mothers as witnesses to the fact that the physician or midwife was in attendance. You yourself know that the birth was not reported. We welcome an appeal, as we desire to discover any weak points in the law, if they exist. Physicians should remember, however, that that involves the dragging of their confiding patrons into court as witnesses, the second time.

"This point was fully appreciated by the Richmond county mothers."

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Framingham, Massachusetts, Will Be "Spotless Town of America."—Framingham, Massachusetts, will be made the Spotless Town of the United States, if the $100,000 that the National Association for the Study and Prevention of Tuberculosis is to spend there in a community health demonstration during the next three years can make it so. Out of several hundred towns, it has been selected by a special committee for a community health demonstration that will seek to show that tuberculosis can be controlled as well as other infectious diseases, if the right methods are employed. The fund for conducting the demonstration has been donated to the National Association by the Metropolitan Life Insurance Company.

The demonstration will be started at once, under the direction of Dr. Donald B. Armstrong, Assistant Secretary of The National Association for the Study and Prevention of Tuberculosis. The committee which will have control of the work consists of Dr. Edward R. Baldwin, Saranac Lake, President of the National Association for the Study and Prevention of Tuberculosis; Dr. Lee K. Frankel, Sixth Vice-President of the Metropolitan Life Insurance Company, New York; Dr. William Charles White, Medical Director of the Pittsburgh Tuberculosis League; Dr. Arthur K. Stone, President of the Massachusetts Trustees of Hospitals for Consumptives, Boston; Dr. Stephen J. Maher, Chairman of the Connecticut State Tuberculosis Commission, New Haven; Mr. Homer Folks, Secretary of the New York State Charities Aid Association; and

Dr. Charles J. Hatfield, Executive Secretary of The National Association for the Study and Prevention of Tuberculosis, New York.

In addition to the money which the committee will spend in Framingham, that city has agreed to coöperate by improving its public health work and by offering certain special facilities for work under the direction of the committee. The leading citizens of Framingham, as well as the State Department of Health, Harvard University, the Massachusetts Institute of Technology and other schools, have offered their help in the demonstration. As part of the plan, it is proposed to place under definite control every living case of tuberculosis, both those that are demonstrably so and those that are suspected of having had contact with the disease.

As a result of this demonstration, it is planned later to use the experience in Framingham in other cities of the United States, to show that tuberculosis can be controlled anywhere.

❖

"Study these Figures."—It is under the above title that the Chicago Department of Health in its weekly bulletin service brings before the public the following striking facts:

In 1915 there were 5,863 cases of diphtheria reported in Chicago with 678 deaths. These cases and deaths of this one disease cost the people of Chicago $3,915,054.00, or an average cost per ward of $111,858.00. Much of this costly sickness and suffering, due to this particular disease, could have been prevented, if only the parents had been intelligently careful in the care of their children.

Take for example, another disease common to child life, that of measles, which is usually regarded as a minor ailment. In fact many parents make the mistake of deliberately exposing their children to this disease in order that "they may have it over with." Last year there were 18,964 cases of measles in Chicago with 236 deaths. And these measles cases and deaths cost the parents of those measles cases, $1,675,423.00, or an average ward cost of $47,869.00. So it is easy to see that it pays to avoid contagion of every kind. It pays in dollars and cents to heed the warnings and advice of the department of health.

Then there is scarlet fever. Let us see how big a money burden it laid on the people of Chicago. Last year there were 3,366 cases with 77 deaths—really a low mortality rate, but for all that the total cost for the year of this disease was $978,830.00, with an average ward cost of $27,966.00. Pity that this money, totalling $6,569,207.00 for the three diseases named, could not have been saved. The facts are, much of it might have been saved, had only the people given their best coöperation to the health officers in their efforts to control the communicable diseases and thus to prevent needless sickness, suffering and deaths.

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Campaign for "Open Window Week."—During the early part of December, in what was originally designed to be the annual observance of "Tuberculosis Week," the New York City Department of Health, in coöperation with the local antituberculosis committees, conducted an intensive educational campaign in the form of "Open-Window Week," calling attention to the value of fresh air in the prevention and cure of disease. The time was fixed at December 4 to 10, inclusive.

Special feature days were observed, as follows:

Open-Window Day—Monday, December 4.

Medical Examination Day—Tuesday, December 5.

Walk to Work Day—Wednesday, December 6.

Sanitary Workshop Day—Thursday, December 7.

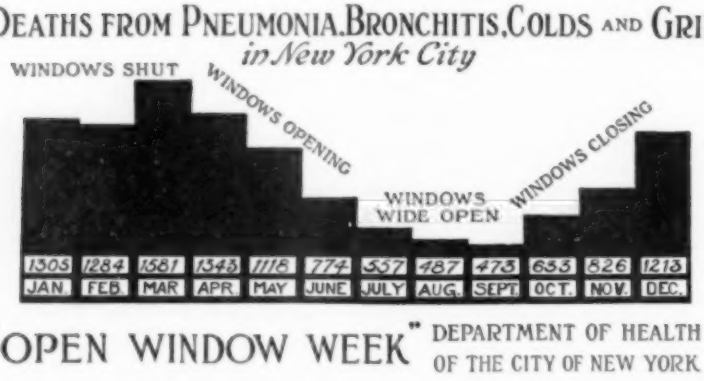
Children's Health Day—Friday, December 8.

Sunshine Sabbath—Saturday, December 9.

Sunshine Sunday—Sunday, December 10.

The significance of the various days needs but little explanation. Medical Examination Day represents an annual effort to induce every one, sick or well, to have a physical examination. The intention is to popularize the movement which thousands of persons have already found to be one of the best ways of preventing serious illness.

Instead of confining the work in schools to Children's Health Day, it was expected that it would be extended to cover the entire week, and that the teachers would endeavor to interest the children in health plays, compositions and orations on matters of public health, especially fresh air in its relation to health. Importance in instructing children in personal hygiene and


DEATHS FROM PNEUMONIA, BRONCHITIS, COLDS AND GRIP
in New York City
WINDOWS SHUT
WINDOWS OPENING
WINDOWS WIDE OPEN
WINDOWS CLOSING
1305 1284 1581 1345 1116 774 557 487 473 633 826 1213
JAN. FEB. MAR APR. MAY JUNE JULY AUG. SEPT OCT. NOV. DEC.
"OPEN WINDOW WEEK"
DEPARTMENT OF HEALTH
OF THE CITY OF NEW YORK

in what they can do to raise the health standard of their community cannot be too strongly emphasized. In connection with the work in the schools, efforts were made to furnish moving picture reels to schools having moving picture machines taking standard films.

The culmination of the week's campaign was the celebration of "Sunshine Sabbath" and "Sunshine Sunday," with special emphasis on the part of churches and religious bodies on health work. The observance of these days was an undenominational, nonsectarian movement. It has in past years, and did this year, reach Jew and Gentile, Protestant and Catholic, and all possible religious groups within these organizations. It received the endorsement of leading church dignitaries of almost every creed and denomination.

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Warning against Mexico.—Due to the present disrupted state of Mexico's public health service, the California State Board of Health through its October *Bulletin* warns the public in that state of the possible, and often probable, dissemination of disease by the Mexicans coming across the border to settle in the United States. This is particularly applicable to the "squatter" camps which are inhabited by Mexicans who come into the state and occupy vacant tracts of land, and live there under the most insanitary conditions. Unless these camps are labor camps the California Commission on Immigration and Housing has no jurisdiction over them, and then the matter is in the hands of the local health officers. As a consequence unless a thorough cleanup of all Mexican quarters is accomplished, there is the possibility of the cities and counties of southern California becoming overrun with typhus fever. Smallpox also comes into notice. Since the Mexicans are not now generally vaccinated, cases of smallpox among them may not necessarily be of the mild form as experienced in cases of that disease in a well vaccinated territory. Already two deaths have occurred from severe cases of smallpox imported from Mexico, and the issued warning seems to be most timely and important.

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Order Body Louse into Quarantine.—Flies, mosquitoes, fleas, ground squirrels and rats have long been recognized in California as carriers of disease, and now the State Board of Health has declared the unmentionable body louse (Pediculus vestimenti) a menace to the public health. Because this insect transmits typhus fever, twenty-five cases of which have recently been brought into California from Mexico, the board has instructed health officers to quarantine any persons or premises known to be infested with body lice, until complete delousing has been accomplished.

In addition, the board has ordered local health authorities to quarantine premises for pediculosis, the classical name for louse infestation, placarding same with a sign which reads:—"PEDICULOSIS. These premises are declared to be in a state of quarantine. All persons are forbidden to enter or leave these premises or to remove any articles therefrom without the permission of the local health authority."

Lodging house keepers, employees, teachers, school nurses and any others who have knowl-

edge that certain persons and premises are infested with body lice are told by the board to report the fact to the local health authority. So, if the Pediculus vestimenti is wise, he will make himself scarce in California.

Because of the fact that epidemics of typhus rise suddenly, generally affecting large numbers of persons within a short time, extreme precautions in the prevention of the disease are essential. Because of the fact that most people in California live under favorable economic and hygienic conditions, the danger presented by typhus is not great, but it is necessary that all insanitary lodging houses, camps, etc., as well as the persons occupying such places, be thoroughly cleaned. Then there should be no trouble in the control of typhus fever in California.

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Needless Killing.—The following severe arraignment is made by the Indiana State Board of Health in one of its recent bulletins against the people of Indiana, and indeed it is quite applicable to people throughout the United States:

"Of course, the killing now going on by explosives, gases and liquid fire in Europe, is needless, and so also is the killing annually of about 10,000 citizens of Indiana by preventable diseases. Killing by explosives and killing by preventable diseases are results of stupidity. If we were not so stupid we wouldn't do it. There is the nasty typhoid fever. Its prevention is known, but we won't prevent. It kills 1,000 annually in Indiana and attacks 25,000. It costs the people not less than $2,000,000 each year and for $200,000 we could put it out. Isn't it stupid not to do it? Then there is consumption. It kills 4,300 annually and its prevention is known, still we won't prevent. It costs the people $10,000,000 annually and yet the last legislature, upon motion of a lawyer member, struck from the antituberculosis law the $2,500 intended for its enforcement. Wasn't that stupidity? If not, what in the name of common sense was it? It surely wasn't economy. Then again, there is diarrhea and dysentery; they kill about 2,000 babies annually under five years of age. We bury them in little white coffins, cry and mourn over them, and wickedly blame the disaster on God. We are to blame, for diarrhea and dysentery result from wrong feeding. We simply don't feed the babies good food. Diarrhea and dysentery are the results of food poisoning. It is certainly stupid for the people of Indiana to poison 2,000 little children annually. Then again, there are those other killers called diphtheria, scarlet fever, pneumonia, etc. They kill over 3,000 annually and they can be controlled. Why don't we control them? Isn't it stupidity not to stop the killing if we can?

"In a certain county forty-nine cases of trachoma were discovered among the school children. Their parents were kindly informed and told the children would almost certainly go blind if not cared for. Three weeks after the letter was sent, investigation discovered that not a parent had taken the proper steps to cure the disease and save the children's eyesight. When the health officers asked the parents why they didn't look after the eye disease and save the children from blindness, they answered, 'You are cranks.' But hurling epithets won't stop trachoma. To better a community first get rid of its morons."

Public Health Notes.

A Health Exhibit for Men at Coney Island.—The summer season at Coney Island was important from the social hygiene point of view by reason of an experiment in adapting the methods of the venereal diseases quack to legitimate public health work through a "Health Exhibit for Men" prepared and maintained by the New York Social Hygiene Society. This exhibit dealt with venereal disease and was open from July 20 to September 20. The American Social Hygiene Association, the New York City Department of Health, the Brooklyn Hospital Dispensary, and the Medical Society of the County of Kings gave it their support and coöperation.

The purpose of the exhibit was largely educational. It presented the facts of venereal disease by pictures, models, cartoons, and printed matter, dealing with the nature of syphilis and gonorrhea, their means of contagion,

and the contrast in possible results between properly treated and neglected cases. One of the most important features, and one which contributed largely to the success of the undertaking, was a free diagnostic and advisory service. The physicians in charge were prepared to direct inquirers to reputable treatment not only in New York City but in other cities and states. Much emphasis was laid upon the danger and folly of patronizing advertising specialists, a collection of whose signs formed an interesting part of the exhibit. Most of these were taken from public toilet rooms at Coney Island. No fees were charged for admittance, diagnosis, or advice. During the two months that the exhibit was open to the public the attendance amounted to over 20,000. The demonstrators estimate that they talked with 8,000 of these, either individually or in groups. About 300 applied for medical advice, of whom about 40 per cent. are known to have reported for treatment.

The interest shown in this experiment in social hygiene methods and the success which has attended the efforts to direct inquirers to reliable agencies have well fulfilled the expectations with which the work was undertaken, and if the present plans of the Social Hygiene Society are carried out it will be opened in New York City the coming winter and reëstablished in Coney Island for the summer of 1917. The experiment is important, not only on account of these possibilities for direct benefit to those who visit it, but as a demonstration of a practical means of public health education and as an attempt to combat the venereal disease quack on his own ground.

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The Rat and Flea in Plague.—In an article entitled, "The Administrative Control of Plague, published in the September, 1916, number of the *Journal of State Medicine* (London), we read this interesting discussion of the role of the rat and the flea in plague:

"The rat, although a scavenger, is yet by instinct a cleanly animal, and while he lives in

filthy drains and sewers and feeds on garbage, has yet found it necessary for his health's sake to be most careful to preserve himself from defilement. He has also an intolerable dislike to the presence of insects in his coat. Further, he has a marked objection to tar, and advantage has been taken of this, amongst other means, to induce him to quit. It is only when the rat is aged or sick that he becomes careless of his toilet and begins to harbour fleas and other vermin.

"Rats are found to be more susceptible of plague than even human beings, and it is almost invariably noticed that an epizootic of this disease amongst the rat population precedes an epidemic amongst human beings. At such times rats are found dying in great numbers on the wharves and in the grain stores by the sea coast, having been infected by the incoming ships, and they may be seen, as I have witnessed in Poona city streets, struggling along the curb, some sick, some apparently healthy, the latter tamely running up and down in the bright sunshine in a peculiar aimless and bewildered manner, and occasionally one here and there overcome by the disease rolls over on his back and literally turns up his toes. It is a great mistake to make light of these warnings of the approach of an epidemic. A plague authority in Poona did so, and men were dying at the rate of 200 a day in the city a few weeks after.

"The remedies are: The people must clear out at once on finding dead rats; houses must be suitably disinfected; the rats must be microscopically examined for plague bacilli.

"Strict cleanliness with free ventilation was insisted on at all times in the plague hospitals at Belgaum, and constituted the main safeguard against infection of the relatives and attendants.

"The Flea.—It is said that fleas have a predilection for particular species of animals, and many varieties of dog fleas, cat fleas, rat fleas, the *Pulex irritans* and the *Pulex penetrans* or jigger have been described, all only too commonly met with in Jamaica. However, the opinion now appears to be gaining ground that although rat fleas will remain upon rats until

their particular host dies, yet, the circulation then ceasing and the body becoming cold, these insects, being only 'true till death,' soon skip off lively and hasten to search elsewhere for their accustomed nutriment. They will probably seek for another rat, but if on their journey they come across another animal, possibly a man, they promptly make a meal off him, and, by way of exchange, infect him with plague. So it is that when rats are dying in large numbers before an epidemic of plague, unattached fleas are found in abundance, and it is inadvisable to walk about on bare feet. . . .

"Adult fleas are sucking animals and take their food in liquid form. Poisons, such as arsenic, which act on the stomach, are clearly useless against insects, unless put in liquid food, which is impossible, and, as in the case of all insects, the use of a contact poison is necessary—one that will kill the insect on coming into contact with the skin. The flea is covered with chitin, a hard substance peculiarly resistant to chemicals, and which is not acted on by any substance generally applicable.

"There is but one way in which such an insect as a flea can be attacked, and that is by using a substance that will affect the breathing system; this opens at the sides of the body in minute air-holes, and it is known that some substances will kill insects through these openings.

"The absolute destruction of fleas can be generally effected best by thoroughly washing the floors and walls with a suitable emulsion—the best insecticide being crude oil emulsion."

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United States 1915 Mortality Statistics.—According to a preliminary announcement with reference to mortality in 1915, issued by Director Sam. L. Rogers, of the Bureau of the Census, Department of Commerce, and compiled under the direction of Mr. Richard C. Lappin, chief statistician for vital statistics, nearly one-third of the 909,155 deaths reported for that year in the "registration area," which contained approximately 67 per cent. of the population of the entire United States, were due to three causes—heart diseases, tuberculosis, and pneumonia—and nearly two-thirds were charged to twelve causes—the three just named, together with Bright's disease and nephritis, cancer, apoplexy, diarrhea and enteritis, arterial diseases, diabetes, influenza, diphtheria, and typhoid fever.

The deaths from heart diseases (organic diseases of the heart and endocarditis) in the registration area in 1915 numbered 105,200, or 156.2 per 100,000 population. The death-rate from this cause shows a marked increase as compared with 1900, when it was only 123.1 per 100,000.

Tuberculosis in its various forms claimed 98,194 victims in 1915, of whom 85,993 died from tuberculosis of the lungs. The progress made in the prevention of this dreaded malady during recent years has been most gratifying. In only a little more than a decade, from 1904 to 1915, the death-rate from tuberculosis in all its forms fell from 200.7 to 145.8 per 100,000. This is a drop of more than 25 per cent. Even yet, however, tuberculosis has the unenviable distinction of causing more deaths annually than any other form of bodily illness except heart diseases, and about 46 per cent. more than all external causes.

Pneumonia (including bronchopneumonia) was responsible for 89,326 deaths in the registration area in 1915, or 132.7 per 100,000. This rate, although lower than for most of the years from 1900 to 1911, inclusive, is higher than for 1912, 1913, and 1914.

The only remaining death-rate higher than 100 per 100,000 in 1915 was that for Bright's disease and acute nephritis, 104.7. The mortality rate from these two causes increased from 89 per 100,000 in 1900 to 103.4 in 1905, fluctuated more or less between 1905 and 1912, and has shown little change since the last-mentioned year.

Next in order of deadliness come cancer and other malignant tumors, which caused 54,584 deaths in 1915. Of these, 21,221, or nearly 39 per cent., resulted from cancers of the stomach and liver. The death-rate from cancer has risen from 63 per 100,000 in 1900 to 81.1 in 1915.

Apoplexy was the cause of 53,397 deaths, or 79.3 per 100,000. The rate from this disease has increased gradually, since 1900, when it stood at 67.5.

Diarrhea and enteritis caused 48,325 deaths in 1915, or 71.7 per 100,000. This rate has shown a marked falling off in recent years, having been 90.2 in 1913 and 79.4 in 1914; and has declined very greatly as compared with the

corresponding rate for 1900, which was 133.2. Nearly five-sixths of the total number of deaths charged to these causes in 1915 were of infants under 2 years of age.

Arterial diseases of various kinds—atheroma, aneurism, etc.—caused 15,685 deaths in 1915, or 23.3 per 100,000. This rate, although somewhat lower than the corresponding ones for 1912 and 1913, is higher than that for 1914, and is very much higher than that for 1900, which was 6.1.

Diabetes was the cause of 11,775 deaths, or 17.5 per 100,000. The rate from this disease has risen almost continuously from year to year since 1900, when it was 9.7 per 100,000.

Influenza caused no fewer than 10,768 deaths in the registration area in 1915, the rate being 16 per 100,000. The rate from this malady, which fluctuates very considerably from year to year, was higher in 1915 than during several years preceding, but was somewhat lower than the average between 1901 and 1910.

No other epidemic disease produced a death-rate as high as 16 per 100,000 in 1915. The fatal cases of diphtheria and croup—which are classed together in the statistics, but practically all of which are of diphtheria—numbered 10,544, or 15.7 per 100,000, in that year, the rate having fallen from 43.3 in 1900.

The mortality rate from typhoid fever has shown a most gratifying and remarkable decline since 1900, having dropped from 35.9 per 100,000 in that year to 12.4 in 1915, the decrease amounting to nearly two-thirds. This decline is greater, relatively, than that shown for any other important cause of death. The total number of deaths due to typhoid fever in 1915 was 8,332. Improved methods of sanitation, including the betterment of the water supply and sewerage systems, the campaign against the fly, and other preventive measures, have proved their efficacy in a striking manner by a reduction of almost two-thirds in the typhoid death-rate during a period covering but a decade and a half.

The principal epidemic maladies of childhood—whooping-cough, measles, and scarlet fever—were together responsible for 11,489 deaths of both adults and children, or 17.1 per 100,000, in the registration area in 1915, the rates for the three diseases separately being 8.1, 5.4, and 3.6, respectively. In 1913 measles caused a greater mortality than either of the other diseases, but in 1914 and 1915 whooping-cough had first place. In every year since and including 1910, as well as in several preceding years, measles has caused a greater number of deaths than scarlet fever. The mortality rates for all three of these diseases fluctuate greatly from year to year. The rates for measles and scarlet fever in 1915 were the lowest since 1900, while that for whooping-cough was somewhat above the lowest recorded rate for this disease, 6.5 in 1904, although far below the highest, 15.8 in 1903.

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Anthrax in Shaving Brushes.—*The Medical Officer*, London, of October 21 reports the finding of anthrax spores in a number of shaving brushes sold in London. The bristles were composed of mixed hair of Chinese origin, chiefly horse, pig, goat and human hair.

The investigation was the outcome of a fatal case of anthrax in a man who had nothing to do with animals, hides, wool or skins. Inquiry developed the fact that a new shaving brush had beeen recently purchased. Not only this brush, but also the rest of the chemist's ("druggist's") stock of six brushes were found to be infected.

Four other cases of anthrax were found outside of London that were traced to the same shipment of brushes.

"But for the timely discovery of Doctor Elsworthy the pathologist, and the subsequent administrative action taken, an outbreak of more serious dimensions might have resulted."

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Rapid Differentiation of the Bacilli of the Typhoid Colon Group by Means of Test Papers (Hollande and Beuverie, *Comp. Rend. de la Soc. Biologie*, vol. lxxviii, p. 722).—For the differentiation of the *Bacillus typhosus*, *B. paratyphosus* A and B, and *B. coli*, the authors employ four test papers which they prepare as follows: (1) A piece of filter paper is dipped into a 1 per cent. solution of silver nitrate and is then quickly dried, it is then dipped into a 10 per cent. solution of collodion in equal parts of alcohol and ether drained and dried in the dark; (2) a filter paper is dipped into a 1 per cent. watery solution of neutral red containing 10 per cent. glucose and then dried and impregnated with collodion as before; (3) the filter paper is dipped into a 10 per cent. watery solution of lead subacetate dried and treated as before with collodion; (4) a paper is dipped into the following solution:

0.2 grm. litmus, 4 grm. neutral sodium phosphate, 5 grm. lactose, 1 grm. sodium bicarbonate, 50 c.c. distilled water; it is then dried and again treated with collodion. For use portions of these prepared papers are dropped into peptone broth tubes which are then autoclaved at 118° C. for twenty minutes. The authors state that the following results are obtained: (1) With the silver nitrate paper a growth of *B. coli* is obtained in twelve hours, of the three other bacteria in two or three days; (2) with neutral red paper the red colour of the paper and broth are unchanged by *B. typhosus*, the paper remains at the bottom of the tube and there is no gas formation. With the three other organisms the colour changes to canary yellow and gas is formed between the collodion and the paper and the latter then floats to the surface. Lead acetate paper is blackened after about twenty hours, except in the case of *B. paratyphosus* A, in which no change occurs. With the litmus lactose paper the lilac colour of the paper and broth is discharged after twenty hours, but in three days the colour returns in the case of the *B. paratyphosus* B.—*Journal of State Medicine* (*London*), November, 1916.

Destroying Lice on Typhus Fever Suspects.—Typhus is endemic in Mexico and a serious factor on the battlefields of Europe. Surgeon S. B. Grubbs of the Public Health Service in *Public Health Reports*, October 20, describes methods based upon experiments of the Boston quarantine service of treating suspected immigrants and their baggage to destroy lice, which transmit the disease.

Persons are sprayed with a solution consisting of:

Soap chips or laundry soap	Part 1.
Soft water	Parts 4.
Gasoline	Parts 4.

After being well soaped, they are showered with clean water.

Meanwhile, clothing and baggage are treated with hydrocyanic acid gas in metal chambers. The air is first partially exhausted by means of a vacuum of 15 to 17 inches, after which the prussic acid is admitted and exposed to the personal effects for 30 minutes. The gas is then exhausted again.

Baggage need not be unpacked, the gas penetrating through cracks.

The method is said to be safe and convenient, and is recommended for lodging-houses and similar institutions for destroying vermin in clothes and bedding.

Rural Work in Child Hygiene.—Why are there so many deaths among country babies and country mothers? And what should the federal government do about it? Miss Julia C. Lathrop in her fourth annual report as chief of the Children's Bureau describes its new rural studies of child and maternal welfare which combine a scientific inquiry with work of immediately practical value to the children of the neighborhoods visited, and suggests a constructive plan for the future.

The report gives many reasons for extending this rural work. First, the Census Bureau's figures show average infant mortality rates in the rural districts higher than the mortality rates found by the Children's Bureau in the more prosperous sections of the cities which it has studied.

Again, the census figures show a markedly high death-rate among country women of child-bearing age for which a larger number of preventable deaths from maternal causes appears to be responsible. It is estimated that more than 15,000 women die year by year in the United States from conditions incident to maternity, while the extent of unnecessary ill health is at present unknown. "The sickness or death of a mother inevitably lessens the chances of her baby for life and health, and it is plain that the question of maternal care in rural districts is of genuine public interest."

An argument for better care of rural childhood is based on the high percentage of physical defects among children in rural schools given in reports of state boards of health. Miss Lathrop concludes: "These comparisons are a strong indication that there is room for great permanent improvement in maternal and child welfare in rural districts. The day when all children shall be well born and well cared for is far ahead, but surely that day should dawn first for the country."

In connection with the bureau's rural studies a child hygiene expert holds a children's health conference to which parents bring their children for examination and advice about daily care (but not for medical diagnosis or treatment).

Parents have shown great eagerness for this kind of help in the counties already visited, bringing their children often long distances, over bad roads, and even sacrificing farm work for the journey.

State and other local officials are urging the bureau to coöperate with them in similar studies and demonstrations in many states, and a number of rural units to extend this work are among the items for which the bureau asks a larger staff and appropriation. Miss Lathrop believes that such federal studies, making plain the necessity and suggesting a method are bound to lead toward adequate local provision for maternal and child welfare.

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Public Health Education.—W. C. Rucker Washington, D. C. (*Journal A. M. A.*, November 11, 1916), says that publicity if properly managed is bound to do good. The chief criticism of what has been done in the past in the way of enlightening the public on the need of sanitation is that it has been too spasmodic and temporary. Too much dependence has been placed on the spoken word; while there has been an enormous amount of speech making and agitation, especially in times of great public danger, the results have too often been only temporary. What the American people want is more demonstration and less talk. Demonstration takes many forms, two of which are here especially noticed, namely, stereopticon slides and motion picture films. These two methods are very good, particularly in the education of children, but the effects lack permanency to a certain degree. The stereopticon lecture must be accurate and also entertaining; the lecture should be effective enough to do without the assistance of the slides and the slides should be good enough to tell their own story. The stereopticon form of demonstration is relatively cheap and that there is a demand for it is shown by the results achieved by the stereopticon loan library of the Public Health Service. The demands on it are enormous and it has been the means in the past year of reaching several million people, and there is no doubt that it has aided in spreading the gospel of sanitation. Moving picture films have not on the whole brought as good results as were expected. People do not go to the movies to be educated as a rule, they go for amusement instead, and the moving picture operators cater to this demand. The sanitary scenario must be sugar coated and live up to the traditions of the moving picture stage, and Rucker does not have any great expectations in its future sanitary instructions. It is surprising, he says, how much good can be obtained through well prepared charts, and well made models are most excellent but they are expensive and the uninterested public will not come to see them in great numbers. Those which contain a puzzle which will make people stand in front and wonder how they operate are very efficient. Printer's ink is the great medium of public health education. Newspaper articles should be written with an absolute absence of medical terms. They must be convincing and still tell the story. Special articles in magazines are of great value and special bulletins are another valuable method provided they can be made to reach the people. The demonstration, however, which is of the greatest value is that which shows to the public just what can be accomplished by sanitation. The health officer who attacks a certain situation and conquers it produces an effect which is lasting, such as the people of New Orleans, for example, have had in the conquest of yellow fever and those of San Francisco in the handling of bubonic plague. The great sanitary hope of the future, Rucker says, is the education of the child today.

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Sanitation in the Philippine Islands.—Gratifying progress is reported in sanitation of the Philippine Islands, as a result of the work of the Sanitary Commissions.

"The first period," writes Surgeon J. D. Long, in *Public Health Reports* of October 27, "or that of the elimination of grave epidemic diseases, extended from the beginning of the American occupation to and including the year 1908. During this period the principal efforts of the health authorities were directed toward controlling outbreaks of cholera, systematically vaccinating the inhabitants to get rid of smallpox, and taking measures to eliminate bubonic plague. The results have been satisfactory in that smallpox and plague have been, for all practical purposes, eliminated, and cholera has been so effectively controlled that it can no longer be considered a menace and, it is believed, can never again assume serious epidemic proportions.

"The second period, or that of constructive sanitation, began in 1906, when investigations were begun with a view to improving the general water supply of the islands."

As early as 1906, the problem of sewage disposal was approached. "Numerous attempts have since been made to solve the question by the use of pits, the installation of pail systems, and by various other methods. Generally, however, the results obtained were worse than the original condition, on account of the fact that proper care was not taken and serious nuisances were created."

Studies in 1915, however, showed that in spite of the previous activities, mortality and morbidity rates were still too high. In order to meet the need for accurate information, it was decided to form sanitary commissions.

The first commission was placed in the field at Pasig, Rizal, in June, 1915. It was composed of a physician, an engineer, a bacteriologist, district nurses and a sanitary inspector.

The census showed that the population of Pasig was 14,752.

"The mortality per thousand inhabitants was, during the year 1914, 36.64, as compared with 82.4 in 1903. The high rate in 1903 was due to the presence of cholera, which did not exist in 1914. Eliminating cholera, therefore, in order to place the two rates upon the same basis, the corrected rate for 1903 was shown to be 68.2 per thousand per annum.

"The increase in population was shown to be due almost entirely to immigration, as during the entire period the difference between the birth and death-rate averaged only about 1 per cent. in favor of the birth rate.

"The principal factors which contributed to the spread and extension of diseases were determined to be as follows:

"In adults, respiratory diseases were caused by faulty personal hygiene, lack of ventilation, failure properly to dispose of sputum and pulmonary excretions, overcrowding in houses, particularly sleeping quarters, and lowered vitality due to lack of a properly balanced and nutritious diet."

The water supply was found to be bad, only 26 per cent. of the inhabitants having a satisfactory supply.

Improper care and feeding of infants was widespread, and examination of breast-milk of mothers showed remarkably high bacterial contents, the counts in 11 samples ranging from 10,000 to 120,000 per c.c.

It is proposed to install a water distribution system, using an artesian well supply. Sewage disposal will be accomplished by means of specially designed outhouses.

A study of diets is being made with a view to furnishing instructions later on.

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New Public Health Association in Connecticut.—The Connecticut Public Health Association came into existence at a meeting held in New Haven on December 6. The attendance of persons from throughout the State was very encouraging. The organization of the Association will undoubtedly mean much for the progress of public health endeavor in Connecticut.

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Sweets and Children's Teeth.—"Sweets should never form the last part of a meal," says Dr. J. H. Gibbs in the *Journal of State Medicine* (London). Sugar gives rise to acids, which decay teeth. Sugary foods are best omitted from a child's diet, he thinks, the starches furnishing all the carbohydrate that is required. However, if we must eat sweets, it is best to let acid fruit or an acid wash be the last part of the meal, as the acid stimulates a flow of saliva, which not only cleans the teeth, but renders the surface alkaline, thus preventing decay.

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Hydrophobia in Alaskan Foxes.—The fallacy that rabies is solely a hot weather disease is well disproven by the following incident, which was originally published in *The Military Surgeon*, and reprinted in the *Medical Record* of November 4th:

"Captain Ferenbaugh, United States Army, mentions the fact that so-called crazy foxes were seen in the Yukon Delta region in the spring of 1915. With mouths hanging open and dripping with foam they would approach settlements and try to bite the dogs. Demented, stiff, and emaciated, they were easily killed. Nevertheless five dogs were bitten and succumbed to rabies. In the interior of Alaska the disease seems to have been unknown until 1914, when a man died of the disease three weeks after the bite of an Esquimaux dog. During the

crazy fox episode a soldier was bitten by one of the infected dogs. He was hurried to San Francisco, took a Pasteur cure and has since remained well. The Esquimaux have in general regarded the craziness of the fox as the result of starvation. But any naturally shy animal which unprovoked attacks men and dogs is best regarded as rabid."

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No Goods on Approval.—Commenting on an ordinance recently passed in San Francisco, Cal., the *New York Medical Record* says:

"After all, it is an unwelcome thought to think of trying on socks, shirts, and underwear that may have been through the same process on the person of one suffering with syphilis, gonorrhea, skin disease, tuberculosis, or even lice. Los Angeles would do well to pass a similar law, as it would do a whole lot to stop the spread of contagious disease."

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Anti-Vaccinationists Discover the Cause of Polio.—Following is an extract of a letter which Dr. Samuel B. Woodward, President of the Massachusetts Medical Society, says was mailed to him by Mr. Jassica L. C. Henderson of Boston, Vice-President of the Anti-Vaccination League of America:

"The psychological moment to repeal the Compulsory Vaccination Law is the next session of the legislature,—owing to the tremendous excitement over infantile paralysis which many experts believe is the inevitable outcome of generations of vaccination.

"We need money. If everyone in sympathy with our cause will do what they can to help we can win out this year!

"Last year we practically won with a vote of 127 in our favor to 105 against, at the second reading of the bill. This was the largest roll-call in the history of the commonwealth, not even excepting the election of the speaker of the house. I mention this to show you the tremendous interest in and pressure brought to bear on our measure. At the third reading of the bill the opposition brought every ounce of their power against us, and we only lost by a few votes. Therefore we have reason to feel proud of the splendid fight we made!"

The letter is printed in full in the *Boston Medical and Surgical Journal* of November 9, together with Doctor Woodward's accompanying letter, which is given below:

WORCESTER, Oct. 30, 1916.

Mr. Editor:—

The enclosed letter with its startling contribution to the etiology of infantile paralysis deserves publicity were it only to emphasize the colossal impudence of the person who signed it.

Its third paragraph does, however, state the exact truth and I wish at this time to call upon every member of the Massachusetts Medical Society to constitute him- or herself a committee of one to interview those who are to be members of the next legislature, to impress upon them the importance of retaining the present law and the punishment sure to follow its repeal.

Very sincerely,

SAMUEL B. WOODWARD, M. D.,
President, Massachusetts Medical Society.

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Mottled Enamel and Brown Stain.—Surgeon F. C. Smith of the Public Health Service, *Public Health Reports*, October 20, calls attention to this defect in the teeth of inhabitants of certain areas.

"This condition is confined to certain geographical areas, of which the following are known: The Salt River and the Gila Valleys in Arizona, the territory affected extending also into old Mexico; an important section in Colorado, including the city of Colorado Springs and rural districts above and below this city on Fountain Creek; small regions in Texas, Virginia, California, South Dakota, and South Carolina, respectively; and probably areas in Oregon, Washington, Idaho, Montana, Alaska, and near Port Henry on Lake Champlain."

The stains, we are told, "are due to a defect in the formation of the enamel caused by the absence of cementing substance occurring normally between the enamel rods in the outer third of the enamel layer. The outer glazed enamel surface, Nasmyth's membrane, is however always normal. When there is a simple lack of the cementing substance, the portions affected contain only air and show through Nasmyth's membrane as a dead opaque white, but when deposits of coloring matter, called brownin by Doctor Black, occur, the teeth appear to be stained yellowish, brownish, or even black, in varying degrees according to the

amount of the stain present in the spaces between the enamel rods. Dental caries is apparently not more frequent in teeth so affected, although repairs are made by the dentist with more difficulty when caries occurs."

The cause is thought to be chemical—possibly some of the rarer elements present in traces in the drinking water.

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First Examination of the National Board of Medical Examiners.—The National Board of Medical Examiners held its first examination from October 16 to 21, in Washington, D. C.

There were 32 applicants from 17 states, representing 24 medical schools, and of these 16 were accepted as having the necessary preliminary and medical qualifications, 10 of whom took the examination.

The following men passed: Dr. Harry Sidney Newcomer, Johns Hopkins University; Dr. William White Southard, Johns Hopkins University; Dr. Orlow Chapin Snyder, University of Michigan; Dr. Thomas Arthur Johnson, Rush Medical School; Dr. Hjorleifur T. Kristjanson, Rush Medical School.

The second examination will be held in Washington, D. C., June, 1917. Further information may be had by applying to Dr. J. S. Rodman, Secretary, 2106 Walnut St., Philadelphia, Pa.

Industrial Hygiene and Sanitation.

Occupational Diseases Discussed at the Annual Meeting of the American Chemical Society.—Some extremely interesting papers on occupational diseases were presented at the recent annual meeting of the American Chemical Society held in New York City. The material contained in each of these papers is of sufficient value to bring it to the attention of members of the Association. It would be difficult to find a more competent set of men than those which took a part in the symposium. The papers deserve a much more thorough discussion than space permits, and only a few of the many excellent points brought out by the authors are given in the following abstracts:

Charles Baskerville, in a paper entitled "Occupational Diseases in the Chemical Trades" discussed the attempt of dealing with occupational diseases here and abroad historically. The New York Section of the American Chemical Society appointed a committee on occupational diseases in the chemical trades in February, 1912. This committee was to advise the State legislature and to investigate existing conditions. The relation of manufacturers and workmen is not always as may be desired. The selfish group of manufacturers is fortunately relatively few in numbers. It is hoped that congress will enact a Federal Workmen's Compensation Law. All new processes should be studied from the standpoint of possible health hazards. A greater extension of the work on these lines by the Public Health Service at Washington, the Bureau of Mines, and the Department of Labor is urged. A Museum of Safety should be established at Washington.

Dr. J. W. Schereschewsky, in a paper entitled "Prophylaxis" states that the necessity for adequate protection of the health of chemical workers is self-evident. In no industry is the worker more exposed to varied and manifold injuries to health. In 1914 the value of the product of the general chemical and allied industries amounted to $1,228,403,984, an increase of 53 per cent. over the 1909 figure. Of the ordinary health hazards in this industry may be mentioned defective illumination, ventilation, extremes of heat and cold, long hours and inadequate factory sanitation. The list of specific hazards is a long one. There are poisons which act superficially, blood poisons and poisons with definite internal action, a so-called remote or specific effect. Poisonous fumes and gases may belong to any of the three groups mentioned. We have to distinguish between irritating and toxic effect. Among the metallic vapors the most poisonous are those of mercury and lead. Of the dusts the most poisonous is lead. Unfortunately no data is available of the morbidity in the chemical industries in this country. German figures show a high morbidity and fatality rate. One large chemical company has requested the Federal Public Health Service to undertake a survey of its establishments with a

view of improving conditions and it is hoped that others will follow.

In a paper entitled "Industrial Poisoning from Aniline and Allied Products," the author, George P. Adamson, states that aniline poisoning in the United States was, until the present foreign disturbance, given but slight attention. The introduction of the manufacture of nitrobenzol and aniline in this country brought very quickly to the attention of manufacturers and physicians the necessity for precautions. The serious cases come from the absorption, caused by the splashing, of the oil on the body without removing the same by immediate washing. Cleanliness is an absolute necessity, and bathing before leaving the plant should be positively required, also washing of hands and face before eating. A man may become poisoned by the oil being absorbed through worn-out soles. Wooden soled shoes are now provided. Each workman should undergo a physical examination before entering the industry. Adamson describes nine cases of poisoning which he personally observed. The result of blood examination showed a reduction in haemoglobin and red cells. If the haemoglobin falls below 70 per cent. the man should be advised to seek other employment. Symptoms, treatment and prophylactic measures are described by various physicians employed in the aniline oil industry.

Dr. W. A. Lynott described the Studies of Occupational Diseases made by the Bureau of Mines. The first studies made by this Bureau were undertaken in connection with the hook worm disease and pulmonary troubles, particularly silicosis, among miners and metallurgical workers. A. J. Lanza and E. Higgins made an exhaustive study of pulmonary diseases and its relation to rock dust in the miners among the mines in the Joplin (Mo.) District in 1915. The influence of siliceous rock dust in the lead and zinc mines was investigated in particular. The records of the State Board of Health for the calendar year 1912 showed a death-rate from pulmonary tuberculosis in Jasper County, Mo., of 200.8 per 100,000 population. It was found that the siliceous dust was largely responsible for the disease. Tuberculosis among coal miners is uncommon. "Miners' asthma" is very rare at present time due to the better ventilation of the mines. Dr. H. W. Gillett investigated the disease known as "brass founder's ague" or "smelter chills." There is no specific remedy. The most probable cause is zinc oxide, the main constituent of the fumes. The disease is seldom if ever fatal. To prevent "shakes," the zinc fumes must not be allowed to enter the nose or mouth. In plants where alloys high in zinc are poured only occasionally the wearing of respirators during such pouring should be made compulsory. Dr. F. T. Hoffman made an extensive study of miners' mystagmus. He claims that the disease is due to a peculiar form of eye strain. It occurs in about 5 per cent. of the European coal miners. The prognosis is usually good but change of occupation is advisable. Dr. J. A. Watkins of the United States Public Health Service investigated health conditions of the steel mills, and urges medical supervision of employees and makes a number of other suggestions relative to sanitation.

Dr. Alice Hamilton in a paper entitled "Dangers Other than Accidents in the Manufacture of Explosives" relates the results of her investigation of some forty plants. Some thirty to thirty-five poisonous substances were encountered, among them hydrochloric, nitric, sulphuric acids, and a large number of benzol derivatives. In addition there are mercury salts, wood alcohol, ether, amylacetate, tetra-chlor-ethane, and others. By far the most important poisons are the oxides of nitrogen, the so-called nitrous fumes. The fumes are worst in the nitrating of cotton and of phenol. Bronchitis and pneumonia may follow the exposure to such fumes. There are many hastily and poorly constructed picric acid plants, sometimes just to fill a single war contract, and carried on without reference to the fundamental conceptions of hygiene. In gun cotton manufacture, once the nitration is over, the only danger is from the solvents. "Ether jags" are frequent. The nitro and amido compounds of benzene and toluene give rise to a very well defined and characteristic form of poisoning. The worst cases from nitrobenzene and from aniline seem to come from spilling the fluid over skin or clothes. The susceptibility of workers to the various forms of poison varies greatly.

These papers may be found in full in the *Journal of Industrial and Engineering Chemistry*, November, 1916.

Effects of the "Safety-first" Campaign.—That the "safety-first" campaign, inaugurated a few years ago, has borne good fruit is brought out by the figures for accidental deaths, as recently prepared by the Bureau of Census, Department of Commerce, in the 1915 United States Mortality Statistics. For 1913, 54,011 deaths were reported as due to accident; for 1914 the corresponding number was reduced by 1770, and for 1915 to 51,406; and during this period there was not only an increase in the population of the registration area as it existed in 1913, but an increase in the extent of the area itself. The rate per 100,000 population for accidental deaths fell from 85.3 in 1913 to 78.5 in 1914 and to 76.3 in 1915. There has been a very considerable reduction in fatalities due to railway, street-car, mine, and machinery accidents, and the increase in those resulting from automobile accidents has not been as rapid as the increase in the number of machines in use.

Deaths due to railway accidents and injuries totaled 6,652 in the registration area in 1915, or 9.9 per 100,000. This number includes fatalities resulting from collisions between railway trains and vehicles at grade crossings. This death-rate is the lowest on record and shows a marked decline during the past 10 years.

Deaths resulting from street-car accidents and injuries numbered 1,555, or 2.3 per 100,000. This rate, like that for railway fatalities, is the lowest on record and shows a material falling off during the past 10 years.

Automobile accidents and injuries caused 3,978 deaths in 1915, or 5.9 per 100,000. There has been an increase in this rate from year to year, but, as already mentioned, the increase has not been so rapid as that in the number of machines in use.

The number of deaths from mine accidents and injuries in the registration area in 1915 was 2,009, corresponding to a rate of 3 per 100,000. This rate shows a material decline as compared with the corresponding figure for 1913, 3.6, and very great decline as compared with that for 1907, 4.8, which is the highest on record.

Deaths caused by machinery accidents in 1915 numbered 1,257, or 1.9 per 100,000. This rate also shows a marked decline during recent years, the corresponding figures for 1913 and 1914 being 2.4 and 2, respectively. The highest recorded rate from this cause is 2.5, for 1907.

Dangers from Automobile Exhaust gases.—If it were possible to collect all those instances in which persons have suffered ill effects from the inhalation of exhaust gases from automobiles we would probably find that many accidents and not a few deaths have resulted from this cause. The direct cause of petrol asphyxia appears to be the carbon monoxide in the exhaust gases as a result of the imperfect combustion of the petrol, or as we commonly use the term, gasoline. In a perfect mixture of air and gasoline the gasoline is entirely consumed but under average conditions a perfect mixture is rarely secured. As a rule the mixture as admitted to the engine through the carburettor, is set for road use. While the amount of gasoline thus employed may serve very well for propelling the vehicle under a load it will probably prove to be too "rich" when the engine is running idle. For this reason the exhaust gases from the engine as it runs idle in the garage or on the street contain a material quantity of carbon monoxide, sufficient if ventilation is not provided to cause ill effects or even death. If an engine is to be allowed to run in a garage especially in the small private garages where air space is limited, provision should be made for free ventilation by allowing both doors and windows to remain open.

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Labor and the Stop Watch.—The following clear and excellent statement on methods of scientific management, appears in a recent issue of the *Youth's Companion*.

"The fact that congress has prohibited the use of stop watch systems of scientific management in government factories and supply depots is a sign of the times that deserves more attention than it has received. The purpose of the various efficiency methods generally referred to by the term 'scientific management' is to increase the production of a manufacturing establishment by eliminating all causes of delay, so that each operative may work continuously at his especial task and with the least possible friction. There is no restriction on his output and for the increased production he receives additional pay in the form of a premium or bonus. The results obtained by applying superior intelligence in planning the workman's task have been astonishing.

"The objection on the part of labor to the system responsible for such results has been slowly gaining strength; it is now clearly formulated,

and, as this legislation shows, can make itself felt. It is based on the belief that scientific management is only another device employed by capital to exploit labor.

"One form this exploitation takes, the opponents of it say, is in neglecting the element of fatigue. Anyone can speed up his work under the pressure of emergency, but a man cannot maintain that pace week in and week out; and when the work is monotonous—repeating thousands of times a cycle of uninteresting motions, careful provision must be made for easing, whenever possible, the nervous strain that it puts on the worker. The objection has some foundation in fact, but it springs not from the system itself, but from the abuse of it. True efficiency cannot be obtained at the cost of the worker's well being. Another way in which scientific management weakens the control that labor desires to effect through organization is that the premium paid to the skilful worker is fixed, not by the approved method of collective bargaining, but by the free decision of the employer. Through such breaches in the defense built up by the forces of organized labor they fear that they may lose all that they have won and held.

"Rightly understood and rightly applied, the methods of scientific management should benefit, not one party at the expense of the other, but the industry as a whole. In the end it will be found that both the side that misapplies those methods and the side that opposes them will suffer, for through its shortsightedness it will have sacrificed the permanent welfare of the whole for the temporary welfare of a part."

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Legislation for Health Insurance.—Through the National Association for the Study and Prevention of Tuberculosis the nearly fifteen hundred antituberculosis associations in every part of the United States will be asked to participate in the campaign for Health Insurance undertaken by the American Association for Labor Legislation.

The Antituberculosis Associations are counting on Health Insurance as an aid in controlling the spread of tuberculosis as it should provide machinery to discover those cases which cannot now be found by the ordinary methods. The antituberculosis workers however expect the greatest help from that feature of Health Insurance legislation which will promote physical examinations in all the industries.

*

Wright Wire Company Insures Employees.—The Wright Wire Company of Worcester and Palmer, Mass., have adopted a plan of insurance for their employees based on length of service. The benefits to be derived are as follows:

All employees one year or less in service to be insured in the sum of $200; all employees more than one year and less than two years in service $300; more than two years and less than three years $400; three to four years $500; four to five years $600; five to six years $700; six to seven years $800; seven to eight years $900; eight years or more $1,000.

The amount of insurance payable to each employee will be automatically increased by each year of service until the maximum of $1,000 has been reached. No employee is called on to assume any expense for this insurance which continues in force while the employee is in the service of the company.

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Safety First in a Rubber Factory.—According to the safety expert of the Republic Rubber Company "Safety First" lies not only in guarding machinery but in educating the men themselves to shun danger and protect their fellow workmen. It is stated that this educational work has in the Republic Rubber Company reduced accidents 50 per cent. as compared to four years ago when the work was first begun.

*

Dust Removal in the Making of Mattresses.—It is stated that a machine has been designed to draw from cotton in the manufacture of mattresses such loose dust as may be contained in the bale of cotton. There is a receiving shute through which the cotton passes into the body of the machine. There the dust is drawn out. The sediment passes through a tube into a condenser.

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Safety-First Week in a Steel Mill.—Postal cards have been sent out by the safety department of the Youngstown Sheet and Tube Company announcing the various events of a Safety-First Week to be held by that company. One of the features of the week will be prizes given to the foremen who can truthfully report that

no accidents have occurred in their departments during the entire period. If there are accidents in the departments a list of them will be posted on bulletin boards together with methods that might have been used to avert them.

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Wage Waste Due to Illness.—At the third annual New England Conference on Tuberculosis held at New Haven on October 13 it was stated that the annual wage wastage due to illness in this country was about $500,000,000. The necessity for legislation to reduce this waste was the subject of interesting discussion among the delegates to the conference.

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Health First.—Health first as an outgrowth of health insurance legislation is one of the most important of the many arguments in support of compulsory health insurance contained in the brief recently issued by the American Association for Labor Legislation. All fields of preventive activity will receive fresh impetus. For example defective factory sanitation will be reformed under the stimulus of cash value given to health by this form of insurance.

To the German sickness insurance system the advance of this country in factory sanitation has been attributed. In Great Britain a medical research committee organized in connection with the national insurance act, has recommended thoroughgoing reforms for the boot and shoe trade, as the result of its inquiry into the incidence of tuberculosis in that industry.

In our own country the rapid progress of safety-first campaigns inaugurated against accident, justifies the conclusion that after a few years' experience under health insurance we shall not be less forward than European pioneers in this new field of preventive work. Preventive medicine will be aided by the increased opportunities possible when a man is not held back by a high fee from consulting a physician, but has ready access to the best medical advice as one of the benefits to which his insurance payments entitle him. Under these conditions which make for the yearly detection of disease the death-rates from cancer, tuberculosis and from the premature degenerative diseases, may be expected to diminish until the mortality rates from the middle age groups show a steady decline. Compulsory health insurance is at once an economical method of providing for the needs of the wage earner and a strong force for the inauguration of a mighty campaign for health conservation.

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"Disinfecting Imported Hides.—Effective January 1, new rules and regulations have been issued by the treasury department and the department of agriculture directed toward the exclusion of anthrax carried in imported hides; also against foot and mouth disease and rinderpest. Hides from countries not shown by the United States consular agents or official veterinary or sanitary inspectors of the countries to be free from anthrax, if such hides are to be admitted on certificate, must be certified to have been immersed in 1:1,000 solution of mercuric chlorid for twenty-four hours instead of thirty minutes, as under present regulations. Hides in bales unaccompanied by certificate of freedom from anthrax, rinderpest or foot and mouth disease, or by certificate of disinfection, will be admitted if such bales have been whitewashed under United States consular supervision and the importers agree to ship them in customs-sealed cars to a tannery provided with adequate facilities for disinfection, and to disinfect them in accordance with the requirements of the Bureau of Animal Industry under supervision of an agent of the bureau. Sun-dried hides from countries certified to be free from anthrax will be admitted without disinfection."—*Journal of the American Medical Association*, Nov. 18, 1916.

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Health Insurance.—The following comment appeared in the *Medical Times* October, 1916. It is very apparent that a part of the medical fraternity is bitterly opposed to social legislation, such as compulsory health insurance.

"Compulsory health insurance will relieve nobody but the charity organizations. It is nothing but a miserable palliative for the evils of poverty. Wages may have gone up in the past few years, but the purchasing power of the dollar has fallen, and the working man is no better off than he was twenty years ago. This is evident to anyone who will examine Chapin's Standard of Living, or Scott Nearing's work on wages, or the statistics of the United States Bureau of Labor. A working man's family of normal size can have no surplus worth talking

about at the end of any year, if indeed it can make ends meet after living decently.

"Compulsory social insurance ought to be abhorrent to a democracy anyway. It is wholly foreign to the genius of American life. From any point of view excepting that of our professional philanthropists (?) it is a deplorable measure.

"If conditions in the world of labor were what they ought to be, such a hideous device as compulsory health insurance would be inconceivable. The passage of such legislation is indicative of the hopelessness of labor's plight.

"The profession should decline to be used in the putting over of such schemes, and the workers should refuse to accept candy sticks in place of economic justice.

"If our boasted altruism is anything but hypothetic, and if we have not reached an utterly cretinoid state, this kind of legislative 'frightfulness' will be throttled beyond hope of resurrection."

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Metering Accidents Day-By-Day.—At the plant of the Inland Steel Company, according to the November *Factory*, the assistant safety inspector balances one month's accidents against another and appeals to the men to beat the previous month's record. To picture the comparison of month-by-month accidents, so that all the men can understand and enter into the spirit of the contest, "the accident meter" was installed on the bulletin board at each of the gates. The "meter" is divided into ninety degrees or points. Each time an accident takes place which results in the loss of one or more day's time the indicator goes up one point. By indicating each day's standing the meter may be compared with the previous month at the same date, and readily show whether accidents are on the increase or decrease. Prizes are offered for safety suggestions.

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Dressmaking as a Trade for Women in Massachusetts.—This investigation, carried on by Dr. May Allinson, according to Bulletin No. 193, Bureau of United States Labor Statistics, proves that there are some phases in the dressmaking trade which are open to improvement, although on the whole the trade provides better working conditions and more opportunities for advancement than are found in most other large women-employing industries. The social content of the employees is distinctly above the industrial level. The investigation assumes greater interest when one knows that the industry employed in the United States in 1910, 338,147 women, 16 years of age and over. Sixty-two per cent. of the girls who went out of the thirteen Massachusetts trade schools in 1914 had been trained for the dressmaking trade.

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Coal-Mine Fatalities in the United States, 1915.—According to a recent report of the Bureau of Mines the coal mine fatalities in the United States for 1915 show a decrease as compared with the year 1914. The fatality rate for 1915 was 2.95 per 1,000 men employed. This is the lowest rate since 1898 when a rate of 2.71 was reported. The actual number killed in 1915 was the lowest since 1906. This saving of lives is ascribed to more careful inspection by the state inspector; better enforcement of laws and regulations by the operators; the miner's realization of the dangers connected with his daily work; the more general use of safety lamps; the use of permissible explosives; humidifying dusty mines; the enactment of industrial accident compensation laws; and the spirit of coöperation on the part of all concerned.

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American Association of Public Employment Offices.—Bulletin 192 of the United States Department of Labor (May, 1916) covers the proceedings of the American Association of Public Employment Offices. The first meeting was held in Chicago in December, 1913, and two other meetings have been held since. The discussion at the three annual meetings have dealt with fundamental principles and practical problems of the greatest interest and usefulness. It must be conceded that unemployment is the greatest evil of our competitive industrial system. It is to be hoped that a national system of employment offices may be developed. Appended is a list of federal, state and municipal bureaus in the United States, and a discussion of public employment offices in Great Britain and Germany. Some very interesting tables show the nature and scope of unemployment insurance abroad.

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The New York State Department of Labor published a special bulletin on the "European

Regulations for Prevention of Occupational Diseases." This interesting bulletin is issued as Bulletin No. 76 under the direction of the Industrial Commission and is valuable as a ready reference for the industrial sanitarian. The regulations refer to brass, bronze, copper, lead and tin, to organic and inorganic dusts, gases, vapors, fumes, anthrax infections, excessive humidity and compressed air.

The Third Annual Report of the Massachusetts State Board of Labor and Industries dated January 1916 details the work which has been done in the previous year and recommends certain legislation. The recommendations refer to industrial work in tenements, employment of minors, wages of mechanics employed on public works, weekly payment of wages, receptacles for expectoration and inspection force. There are 50,000 industrial establishments in Massachusetts and only 24 inspectors to do the work. An additional force of 12 inspectors is urgently needed. Of special interest to the industrial sanitarian is the report of the "Industrial Development Division." Appendix E analyzes all of the reported industrial diseases in tabular form. The report contains further the bills presented to the legislature by the State Board of Labor and Industries during 1915 and some Supreme Judicial Court Decisions.

Florence E. Perry outlines the scope of work of the Cleveland "Occupational Disease Bureau" in the October copy of *The Public Health Nurse Quarterly*." This new department grew out of the Tuberculosis Bureau of the Division of Health in Cleveland. At the present time the work of the new bureau consists of (1) Recording occupational histories received through the dispensaries, (2) Reporting to the state all cases of industrial tuberculosis, (3) Visiting the local factories and industries to learn the extent of industrial welfare work and to bring their attention to cases of occupational disease coming from their plant. The bureau coöperates actively with the State Division of Industrial Hygiene. The work meets with the hearty coöperation of the employers. Many employers speak enthusiastically of the value of medical inspection and nursing service, but feel that the other welfare activities are adopted for their advertising value. The greatest need in an industrial community is a hospital and dispensary for the study of occupational diseases as is maintained in Milan (Italy), where it has proved of inestimable value.

The same publication contains an article on "Industrial Nursing" by Alice L. Eastman. She points out that this phase of welfare work is rapidly spreading. A dispensary centrally located in one of the factory buildings is essential as a nucleus. Health talks on prevention of illness and disease give splendid results. The nurse can make herself valuable in many ways. She can look after sanitary matters which do not require the attention of an expert specialist. She can look after the employees in their own houses, give pre-natal advice to expectant mothers, and instruct them how to take the best care of their children. The nature of the nurse's work will depend largely upon where she locates and what is manufactured. A weekly or monthly report should be sent to the management.

The Pennsylvania *Medical Journal* of October, 1916, gives a detailed account of the Conferences of Physicians, which were held February 17 and May 18, 1916 in Harrisburg under the auspices of the Pennsylvania Department of Labor and Industry. Some of the papers read were: "Asphyxiation and Suffocation," "Lead Poisoning," "Relation of Extreme Temperatures to the Efficiency of the Workman" and "The Mortality from Diseases of the Lungs in American Industry." The credit for having brought the industrial physicians of the State together belongs to Dr. Francis D. Patterson, Chief of the Division of Hygiene and Engineering, Pennsylvania State Department of Labor and Industry.

The *Monthly Review* of the United States Bureau of Labor Statistics (November, 1916) is as usual a mine of information. A large number of domestic and foreign publications pertaining to industrial hygiene, health insurance and employment is abstracted. Anyone who has not the time to follow the ever increasing literature of the broad fields will find it to great advantage to have the *Monthly Review* on his desk regularly. The first article calls attention to Conference on Social Insurance, called by the International Association of Industrial Accident Boards and Commissions to be held in Washington, D. C., December 5 to 9, 1916. At

this conference will be considered the merits, demerits, defects and shortcomings in our workmen's compensation laws, needed amendments, sickness insurance, pensions, mother's pensions, and other matters relating to social insurance. It is the purpose of this conference to define the problems clearly for the information of legislators and administrators. The proceedings of the conference will be published by the United States Bureau of Labor Statistics as a bulletin of that bureau.

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The Special Bulletin No. 79 of the New York State Department of Labor, Division of Industrial Hygiene, is wholly devoted to a discussion of "Anthrax." The occurrence in 1914 of several cases of suspicious skin infections in tameues in New York State led to the investigation of the prevalence of Anthrax. The causes of the outbreaks and the methods of control and eradication are gone into at considerable detail. The bulletin concludes with valuable recommendations for the physician, the employer and the workman.

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The Third Annual Report of the Department of Workshop and Factory Inspection of the State of Tennessee deals with the efforts and accomplishments of this department in the enforcement of industrial laws. Proper ventilation was one of the most important problems and the most difficult. A compilation of the expenditure per capita on the part of the State of Tennessee for its labor department shows that the state is far behind other progressive states. New York State for instance shows a per capita expenditure of $0.758, Tennessee an expenditure of only $0.051. The result of the inspection work, hours of labor and individual accidents are given in tabulated form.

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The September Bulletin of the Pennsylvania Department of Labor and Industry contains a compilation of all essential portions of the Pennsylvania Labor Laws.

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The Bulletin of the Industrial Commission of Ohio, Report No. 21, contains information for the first eighteen months of the Ohio Workman's Compensation Act as a compulsory measure, January 1, 1914–June 30, 1915. It furnishes information concerning 100,003 industrial accidents and will be found to be of great assistance in the campaign for accident prevention. The total amount awarded was about four and a half million dollars. The total number of claims disallowed was 7,986. Eighteen claims involving permanent total disability were allowed. The report classifies accidents as to cause by the primary or principle cause. This is not necessarily the immediate cause. The whole matter is tabulated extensively.

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Bulletin 78 published by the New York State Industrial Commission contains the text of the labor laws and other laws relating to labor which were enacted in New York State in 1916. These laws pertain to fireproof construction of factories, labor on public works, employment of children in making motion picture films, illiterate employees on trains, child labor certificates, automatic sprinklers in factories, inspection of buildings in New York City, and workmen's compensation. Altogether thirteen laws were passed.

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According to November *Factory*, the Anaconda Copper Mining Company has established a rule that any man who fails to take the necessary precautions for safety should be laid off for a period of seven days. A 50 per cent. reduction of serious accidents in their plant is largely attributed to this step which the company considers is necessary for the protection of the men themselves.

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The August Bulletin of the Pennsylvania Department of Labor and Industry is as usual full of timely hints and matters pertaining to industrial hygiene and accident prevention. It deserves the earnest attention of the students of this particular field. How much there remains to be done can best be judged from the fact that during the first six months of 1916 the number of killed and injured in this state was 20,197. The number of killed was 189.

Personal Notes.

Mr. Nels A. Nelson of Fitchburg, Mass., formerly health officer of Long Branch, N. J., has been appointed health inspector of Red Bank, N. J. He is a graduate of the Worcester Polytechnic Institute, and goes to Red Bank with the endorsement of the New Jersey State Board of Health.

Surgeon W. H. Slaughter of the United States Public Health Service, formerly in charge of the Federal Health Survey, Floyd County, Georgia, has been transferred to the Marine Hospital, Stapleton, N. Y.

Dr. Frank G. Beard has resigned his position as health officer of the city of St. Joseph, Mo.

Dr. W. E. Cole of York Village, Maine, has been appointed epidemiologist of Akron, Ohio.

The Health Department of the District of Columbia announces the appointment of Dr. Joseph A. Murphy, formerly with the medical service of the United States Office of Indian Affairs, as chief medical and sanitary inspector of public schools; and the appointment of R. R. Ashworth, D. V. M., as chief food inspector.

The following persons were elected to membership in the American Public Health Association, December 1, 1916:

Perkins Boynton, Clarksburg, W. Va., Chemist and Bacteriologist for Water Filtration Plant.

Abraham Zingher, M. D., New York City, Assistant Director Research Laboratory, Department of Health, Bureau of Municipal Research, New York City.

Arthur A. Metcalf, M. D., Crystal Falls, Mich., City Health Officer.

Wm. Hassler, M. D., San Francisco, Cal., Health Officer.

Charles Weisman, Pittsburgh, Pa., Sanitary Chemist, United States Public Health Service.

I. S. Osborne, Cleveland, Ohio, Consulting Sanitary Engineer.

C. W. Girdlestone, M. D., Riverside, Cal., Health Officer.

John Thames, M. D., Winston-Salem, N. C., Health Officer.

Hector Palardy, M. D., Hull, Que., District Health Inspector.

Prof. G. O. Higley, Delaware, Ohio, Teacher of Chemistry.

George Elliott, A. I. S. E., Karachi Cantt, India, Sanitary Engineer.

Current Public Health Literature.

AMERICAN.

Albany Medical Annals.

XXXVII. November.

The Modern Medical School: Its Relations to the Hospital and the Medical Profession. George Blumer.

Albany Hospital. Fourteenth Report of Pavilion F, Department for Mental Diseases, Year ending September 30, 1916. J. M. Mosher.

American Journal of Diseases of Children, Chicago.

12. November.

The Neurotic Child. Some Familiar Symptoms and their Problems. C. Macfie Campbell.

Provocative and Prophylactic Vaccination in the Vaginitis of Infants. A. F. Hess.

The Effect of Cold Air on the Blood Pressure in Pneumonia in Children. J. L. Morse and D. M. Hasseman.

Acetone Body Production in Infancy and Childhood. J. Howland and W. McK. Marriott.

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XVII. November.

Diet Kitchen Methods of Instruction. Alice U. Fewell.

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CLXXV. November 9.

Syphilis of the Lungs. N. K. Wood.

Control of Scarlet Fever. D. M. Lewis.

Report of Committee on Workmen's Compensation.

November 16.

Mental Pitfalls in Adolescence. H. R. Stedman.

The Relation of the State Department of Health to the Communicable Diseases of Childhood. A. J. McLaughlin.
Measles and the Public Health. E. H. Place.
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The Physically Defective. Edward O. Otis.
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November 30.

Psychic and Neuropsychic Affections in War. E. Régis.
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XV. October.

A Report of the Compliment Fixation Test for Gonorrhea. T. P. Shupe.
The Progress in Pediatrics. Infantile "Grip." H. C. King.
Review of the Progress in Medicine. Paratyphoid Fever. H. Feil.

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LXVII. November 4.

The Duty of the Medical Profession Toward the Council on Pharmacy and Chemistry. R. A. Hatcher.
A Study of Two Hundred and Twenty-six Cases of Chorea. I. A. Abt and A. Levinson.
The Recent Epidemic of Grip. J. A. Capps.
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November 11.

The Health Education of the General Public. W. C. Rucker.
The Nonspecific and the Specific Defense of the Child against Tubercle Bacillus. F. M. Pottenger.
The Use of Boiled Milk in Infant Feeding and Elsewhere. J. Brennemann.
The Use of Malt Soup Extract in Infant Feeding. B. R. Hoobler.
Bacteriologic Findings in Cerebrospinal Fluid in Poliomyelitis. A Preliminary Report of the Examination of Fifty Cases. J. W. Nuzum.
The Therapeutic Research Committee of the Council on Pharmacy and Chemistry of the A. M. A. Torald Sollmann.

November 18.

Useful Drugs. M. I. Wilbert.
Duodenal Cultures in Typhoid Fever as a Means of Determining Complete Convalescence. A. L. Garbat.
The Relation of Diet to Beriberi and the Present Status of Our Knowledge of the Vitamines. E. B. Vedder.
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Epidemics of Pemphigus Neonatorum in Chicago. F. H. Falls.

November 25.

Further Studies of the Protein Poison. V. C. Vaughan.
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Studies of the Prophylactic Immunization with Bacillus Typhi-Exanthematici. Harry Plotz, P. K. Olitsky, G. Baehr.

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19. November.

The Specificity of the Alderhalden Reaction with Vegetable Proteins. The Biologic Reactions of the Vegetable Proteins. O. J. Elsesser.
The Complement Content of Eck-fistula Dogs. N. P. Sherwood, C. Smith, R. West.
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Experimental Studies with Endamoeba Gros. F. Hecker.
Culture Media for Gonococcus. T. Watabiki.

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II. October.

Uric Acid in Its Relation to Metabolism. S. R. Benedict.
Poisonous Proteins. V. C. Vaughan.
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XIII. December.

How We Can Help the Tuberculous. A. K. Krause.
The Passing of the Tubercle Bacillus. H. M. Friedman.
Talks to Children in Red Cross Seals.

November.

The History of the Growth of the Antituberculosis Movement in Massachusetts, and the Lessons to Be Learned Therefrom. V. Y. Bowditch.
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Oblication of the Discharged Sanatorium Patient. J. S. Ford.

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III. November.

Report of the Mouth-Infection Research Corps of the National Dental Association. T. B. Hartzell, A. T. Henrici, W. A. Grey.
The Specificity of Streptococci. A. T. Henrici.
Proceedings of the National Dental Association.
Sweeping Away the Confusion that Has Existed Regarding the Streptococci of the Mouth. Editorial.

Interstate Medical Journal, St. Louis.

XXIII. November.

Plea for the Tabetic. Morris Crossman.
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On Shame. James Rae.
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80. November 11.

Infant Malnutrition. W. H. Porter.
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November 18.

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Latin and Ancient Greek for Modern Doctors. A. Jacobi.
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A Theory of the Causation of Poliomyelitis. D. W. Wynkoop.
Report of the Committee on Industrial Hygiene of the Retail Dry Goods Association. M. H. Kahn.
Observations of Tetanus with Observations of a Successfully Treated Case. L. Sexton.

Modern Hospital, St. Louis.

VII. November.

Brooklyn's Oldest Hospital Built Anew. W. J. Nealley, J. M. Hewlett.
The Convalescent Institution—Methods—Results. Frederick Brush.
The Hospital and the Surgeon. S. S. Goldwater.
New Army Train for the Mexican Border A. G. Grinnell.
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New York Medical Journal

CIV. November 11.

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Shall We Get Rid of Tuberculosis At Last? R. C. Newton.
One Thousand Wassermann Reactions. J. M. Ladd.

November 18.

Birth Control. S. A. Knopf.
Public Health. Harry Greenstein.

November 25.

The Aftertreatment of Infantile Paralysis. R. H. Sayre.
The Treatment of Infantile Paralysis. H. W. Frauenthal.
The Treatment of Infantile Paralysis. F. E. Peckham.
The Speedy Cure of Tuberculosis. J. D. Gibson.
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XX. October.

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Presidential Address before the Canadian Public Health Association. Peter H. Bryce.
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Sanitation as It Was. A. P. Reid.
Small Water Works and Sewage Works. R. O. Wynne-Roberts.

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31. November 10.

Poliomyelitis—The Status of the Disease in New York City and Elsewhere. C. H. Lavinder.
Public Health Administration—City of Birmingham and County of Jefferson, Ala. Carroll Fox.
The Laboratory Diagnosis of Diphtheria. N. E. Wayson.

November 17.

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November 24.

Poliomyelitis. The Difficulties of Ascertaining Its Actual Prevalence and Distribution.
Prevalence of Syphilis. Wm. M. Bryan.
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ENGLAND.

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XXIV. November.

Rivers as Sources of Water Supply. A. C. Houstan.
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Medical Officer, London.

XVI. October 7.

The Effect of Strict Milk Inspection.
Defective Eyesight in Schools. C. S. Thomson.

October 21.

The Health of London during 1915.
The Tuberculosis Casual. G. Clark Trotter.

November 4.

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Enteric Fever at Maidstone.
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2. The Shortcomings of Socio-Health Investigations. Mr. Franz Schneider, Jr., Sanitarian, Department of Surveys and Exhibits, Russell Sage Foundation, New York City.
3. The Application of Statistical Methods to the Field of Socio-Health Research. Dr. Louis I. Dublin, Statistician, Metropolitan Life Insurance Co., New York.

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DECEMBER 1916 CONTENTS Vol. VI No. 12

PAGE

Psychiatric Clinics in the Schools 1265
John T. MacCurdy, M. D., *Psychiatric Institute, Ward's Island; Visiting Neurologist, Randall's Island, New York City.*

The Relation of Alcohol and Syphilis to Mental Hygiene 1272
Frankwood E. Williams, M. D., *Executive Secretary, Massachusetts Society for Mental Hygiene; Chairman, Advisory Prison Board, Boston, Mass.*

The Relation of Social and Economic Factores to Mental Hygiene 1278
C. Macfie Campbell, M. D., *Johns Hopkins Hospital, Baltimore, Md.*

Registration of Mental Disorders 1283
A. J. Rosanoff, M. D., *Kings Park State Hospital, Kings Park, New York.*

Editorial—The Standardization and Control of the Bubble Fountain 1288

Two New Services 1289

Malaria as a Public Health and Economic Problem in the United States 1290
John W. Trask, *Assistant Surgeon General, United States Public Health Service.*

The New United States Life Tables, Their Purpose and What They Show 1298
James W. Glover, *Professor of Mathematics and Insurance, University of Michigan, Ann Arbor, Mich.*

Pathogenicity and Longevity in Diphtheria Bacilli 1303
Frank W. Schofield, D. V. S., *Union Medical School, Seoul, Korea.*

Refuse and Garbage Disposal: A General Survey 1307
Louis L. Tribus, *Consulting Engineer, New York City.*

Provisional Report of the Committee on Standard Methods of Bacteriological Analysis of Milk, 1916 1315
M. P. Ravenel, M. D., *Chairman.*

Bibliography of Tuberculosis in Its Relation to House Infection and Housing Betterment 1327
James Ford, *Department of Social Ethics, Harrard University, Cambridge, Mass.*

Book Reviews 1334

Health Department Reports and Notes 1335

Public Health Notes 1345

Industrial Hygiene and Sanitation 1354

Personal Notes 1362

Current Public Health Literature 1362

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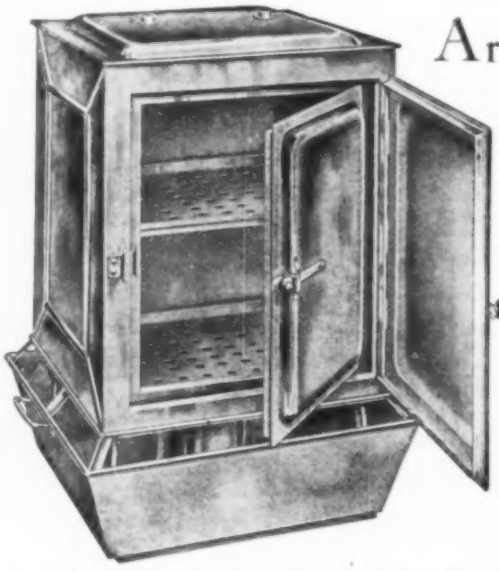

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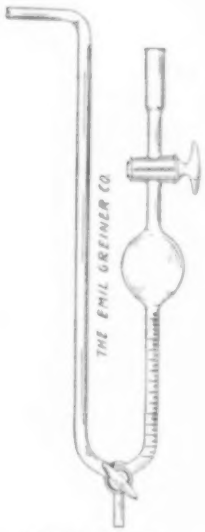

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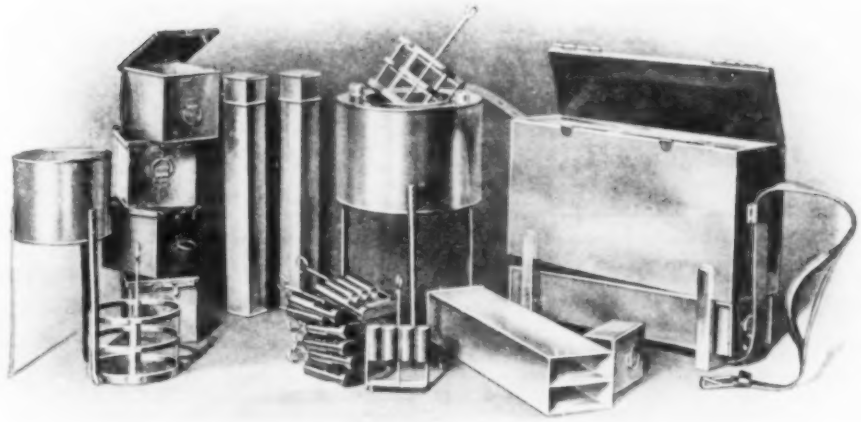

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